OLOGY DEPT.

November, 1946

DETROIT

THE FOUNDRY

wherever metals are cast...

For Modern Metal Handling Equipment

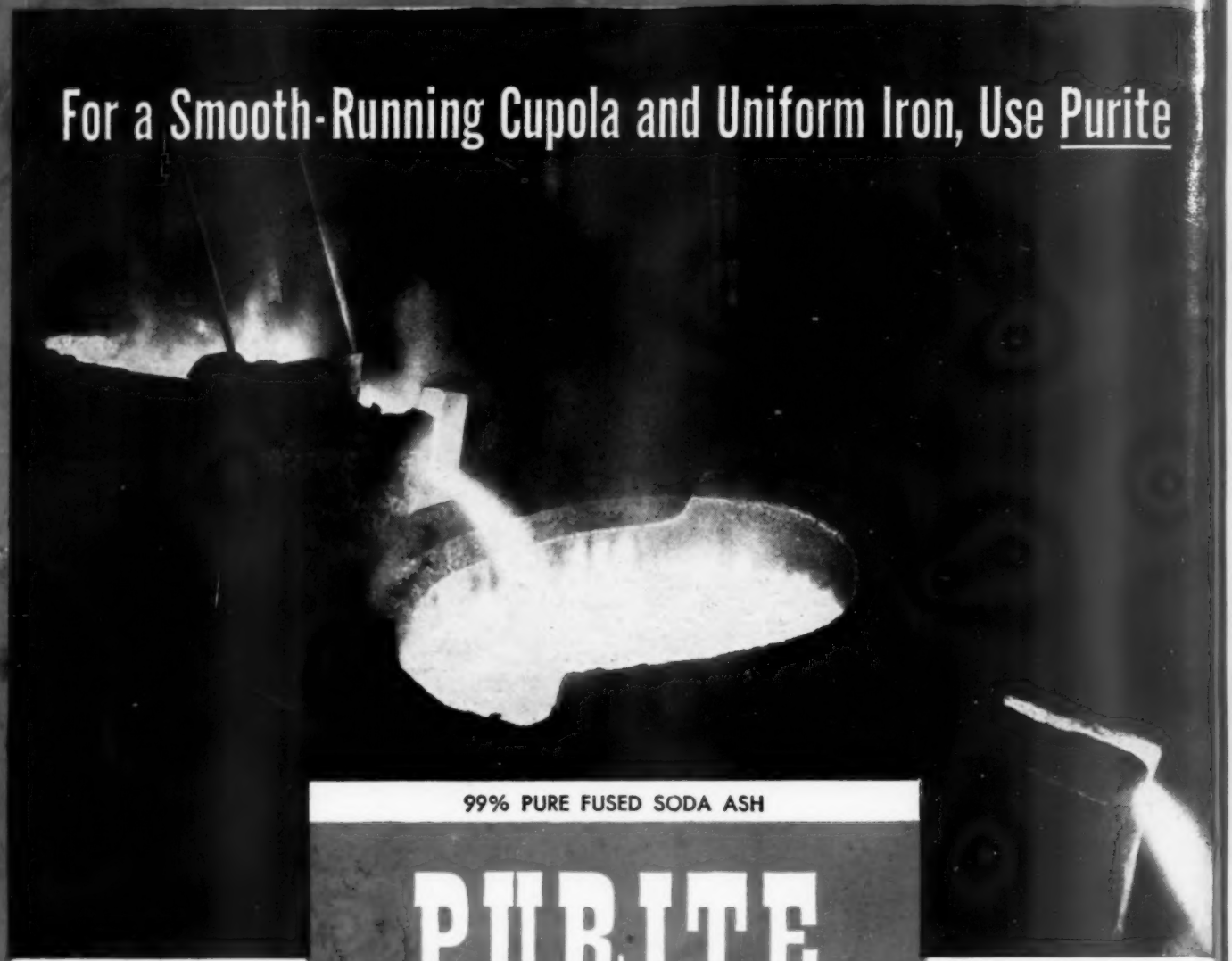
LOOK TO

MODERN EQUIPMENT CO.

Port Washington, Wis.

CUPOLAS CUPOLA CHARGERS ALL TYPES OF LADLES METAL POURING SYSTEMS
HOIST & MONORAIL SYSTEMS FURNACE CHARGING CRANES ELECTRIC MOLD SKIN DRIERS

For a Smooth-Running Cupola and Uniform Iron, Use Purite



99% PURE FUSED SODA ASH

PURITE

The Scientific Flux for Better Melting and Cleaner Iron

A smooth-operating cupola, from the start to the finish of the heat, is the first essential in maintaining uniform iron in the mass production of specification castings.

Purite—in the cupola hearth or in the ladle—helps smooth out variations in the molten metal. By accelerating combustion reactions, Purite restricts the combustion zone to a smaller, hotter area over the tuyeres; it prevents bridging and reduces oxidation of the metal charge. Purite makes a refining slag which purges the molten iron of sulfur, oxides and silicates and thus helps to improve machinability and to reduce shrinkage and segregation defects.

Purite has been used for over 20 years in helping to make sounder and better castings. Can you afford to overlook this inexpensive means of improving your castings?

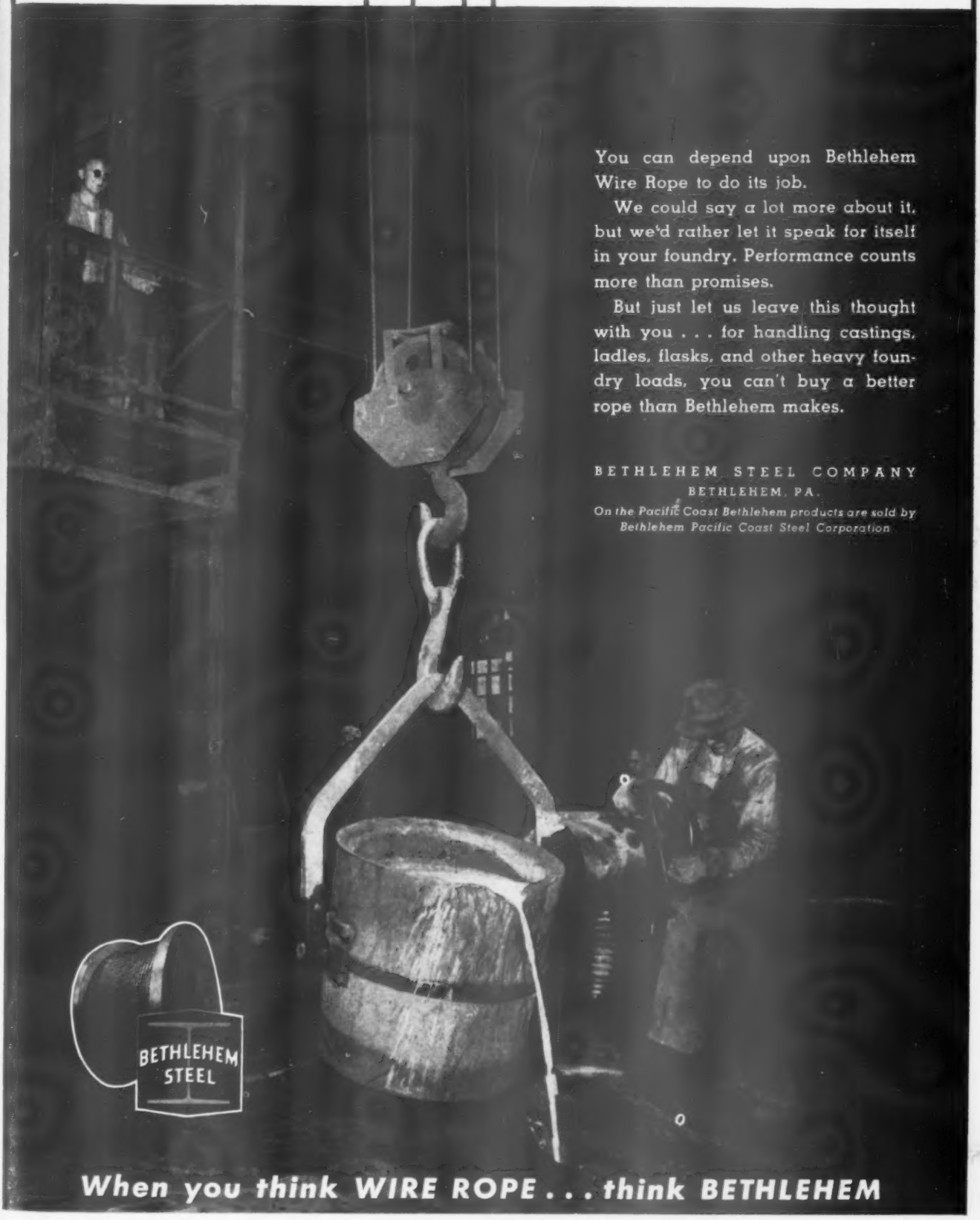
Our advice is always available—to help you improve your cupola practice and make better castings with Purite.

THE MATHIESON ALKALI WORKS (INC.)
60 EAST 42nd STREET, NEW YORK 17, N. Y.
In Canada: Railway & Power Engineering Corporation, Limited

Mathieson
CHEMICALS

Purite (Fused Soda Ash) . . . Chlorine Dioxide . . . Caustic Soda . . . Soda Ash . . . Bicarbonate of Soda . . . Ammonia, Anhydrous & Aqua . . . Sodium Chlorite Products . . . Liquid Chlorine . . . HTH Products . . . Synthetic Salt Cake . . . Dry Ice . . . Carbonic Gas . . . Sodium Methylate

WHERE IT SPEAKS FOR ITSELF



You can depend upon Bethlehem Wire Rope to do its job.

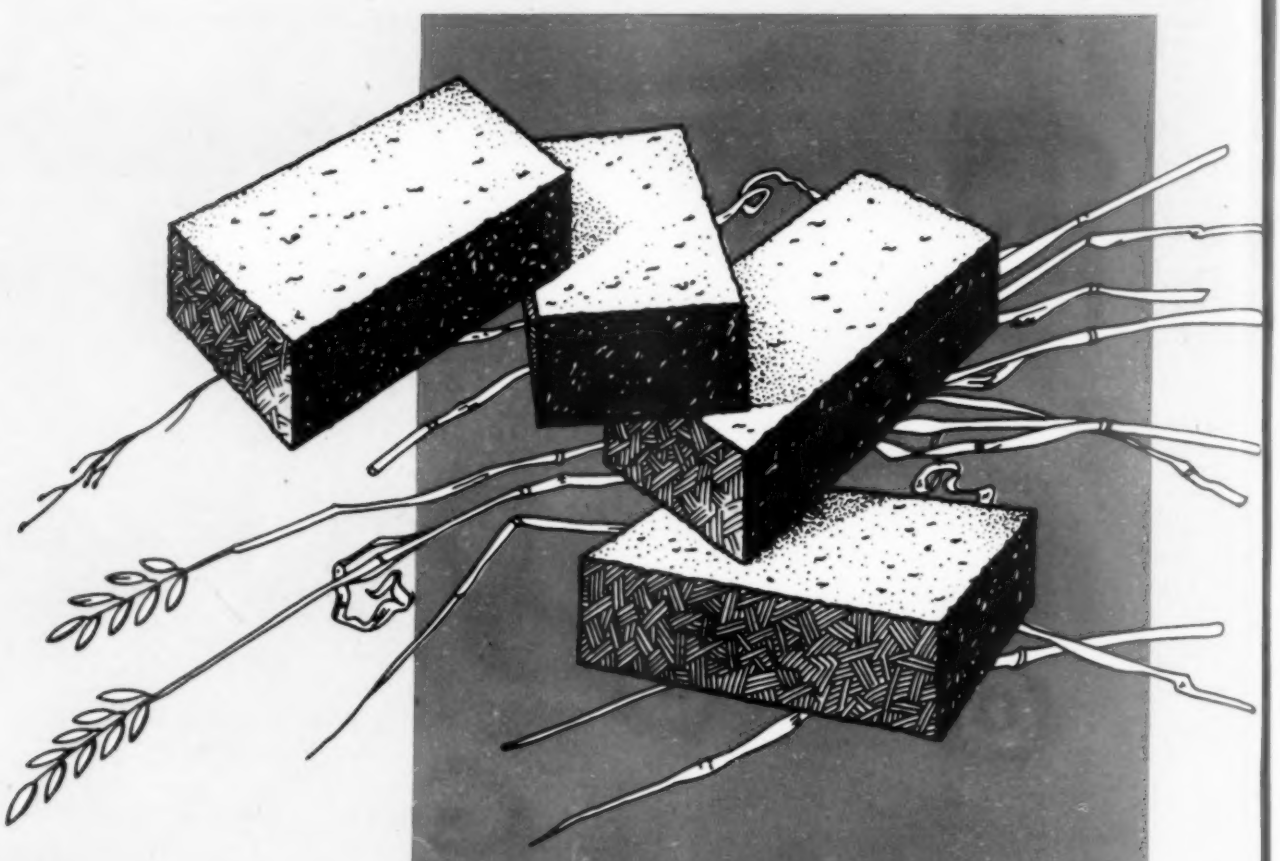
We could say a lot more about it, but we'd rather let it speak for itself in your foundry. Performance counts more than promises.

But just let us leave this thought with you . . . for handling castings, ladles, flasks, and other heavy foundry loads, you can't buy a better rope than Bethlehem makes.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

When you think WIRE ROPE . . . think BETHLEHEM



Alert brick makers don't make bricks without straw... and alert foundrymen don't operate without

FEDERAL GREEN BOND

When a necessary ingredient is available for a manufacturing process, it is folly to ignore it. FEDERAL GREEN BOND is such an ingredient. Its use regulates sand strength, and control of sand strength is the first step toward the production of good castings. FEDERAL GREEN BOND is used by foundrymen everywhere as standard practice, because FEDERAL GREEN BOND is the best of the Bentonites.

THE FEDERAL FOUNDRY SUPPLY COMPANY

4600 East 71st Street • Cleveland 5, Ohio

Seacoal Plant
CROWN HILL, W. VA. • CHICAGO • CHATTANOOGA, TENN. • DETROIT • MILWAUKEE • NEW YORK • ST. LOUIS • RICHMOND, VA. • Mines UPTON, WYO.

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THE FOUNDRY

for NOVEMBER 1946

VOLUME 74 NUMBER 11

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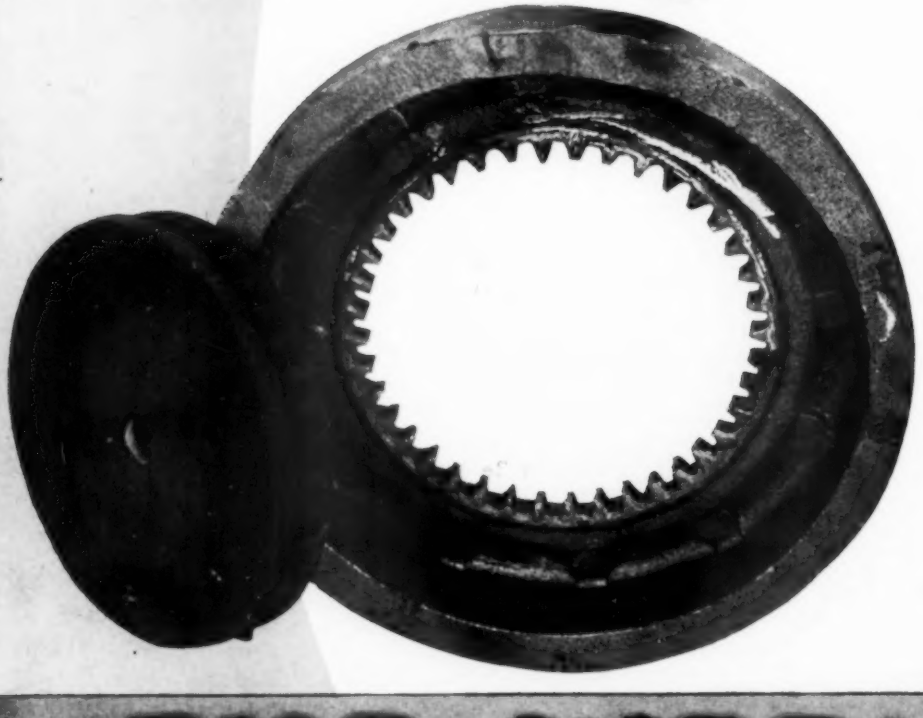
Jobbing Demands a

THE ALLOY CAST STEEL C

MARION - - - - OHIO

Specializing in high manganese steel castings; and convinced that where cores are needed the *best* cores are needed.



"We at the Alloy have used Werner G. Smith's Original Linoil for cores since 1928, a matter of 18 years. I will say that we have always found Linoil to be uniform in quality and competitive in price." C. H. Welch, Plant Manager.

THE WERNER G

(DIVISION OF ARCHER DA

2191 WEST 110 STREET WOODBINE 6

ls a Versatile Oil

ELCO.

LINOIL

The Logical Oil

The jobbing foundry requires a flexible core oil that can be used safely in a variety of jobs, an oil with a wide range of usability, a broad margin of safety. Linoil has this flexibility, this broad margin of safety. There is of course an ideal ratio for each core. Production foundries can work this out to the nth degree and get marvelous economy with Linoil, but the jobbing foundry does not worry about this hairline target. One mix, all sorts of cores out of it, and perfection in every core, that is the jobbing foundry's problem. Seriously thinking foundrymen choose Linoil because it is such a grand all-purpose oil, with such flexibility, and such a wide margin of safety. Anywhere within wide brackets Linoil scores 100%. Linoil is extremely economical and absolutely dependable in the jobbing foundry.

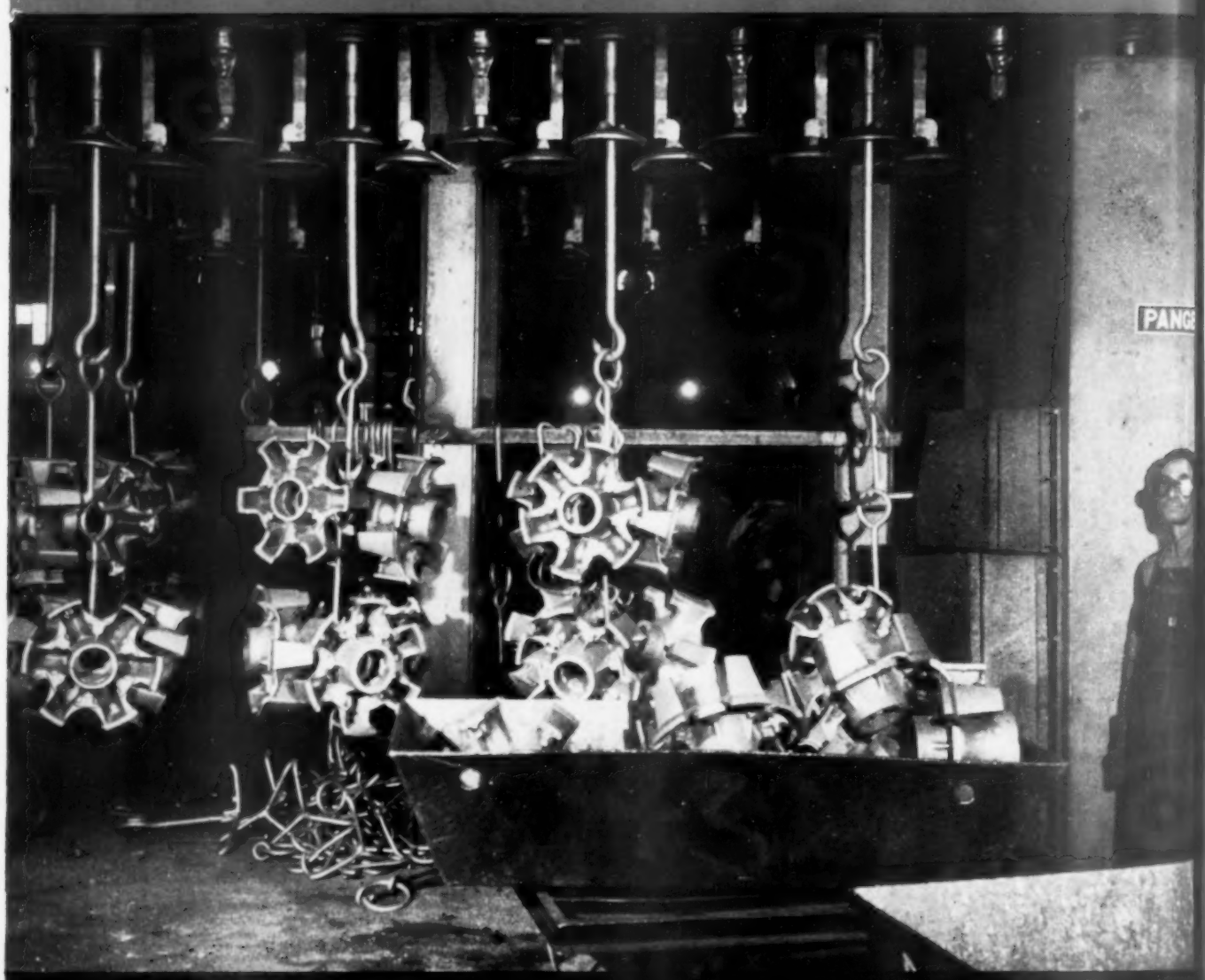
SMITH COMPANY

DANIELS - MIDLAND COMPANY)

690 CLEVELAND 2, OHIO

Pangborn

PANGBORN CORPORATION, HAGERSTOWN, MARYLAND



Rotoblast

The airless centrifugal unit that propels metal abrasive without crushing, without wast

TORRENTS OF METAL "RAIN" wash out a costly bottleneck

600 TRUCK WHEEL CASTINGS CLEANED PER 8-HOUR DAY!

In a large steel foundry in Ohio, a Pangborn Special ROTOBLAST* Machine speeded up and improved the quality of cleaning to such an extent that the cleaning department—once a bottleneck—is now way ahead of grinding and finishing.

In its first day of operation, a "mountain" of castings that had been growing steadily was reduced to a molehill—and the cleaning department was three days ahead!

Better Cleaning — Easier

Castings are blast cleaned in the green stage before annealing—which means they go through the ROTOBLAST machine twice. The first blasting removes burned-in sand before the annealing process has a chance to cover it with heavy scale. Also permits faster and more economical removal of gates and risers. The second blasting—after annealing—removes heavy scale and produces a high luster finish in much less time than would otherwise be possible.

Here are some samples of ROTOBLAST performance—evidence of the higher production provided by this airless blast cleaning system which uses streams of metal abrasive under centrifugal force to do the cleaning.

Truck wheel castings: green, with risers, nearly 200 pounds each. ROTOBLASTing time: one minute (that's as fast as they can be loaded). After annealing, ROTOBLASTing time: four minutes for a high luster finish.

Road machine wheel castings: green, with risers, weighing up to 485 pounds (average load per hook: 1800 pounds). ROTOBLASTing time: one minute, fifteen seconds. After annealing, ROTOBLASTing time: three minutes for a high luster finish.

Miscellaneous castings up to 4700 pounds. ROTOBLASTing time: four minutes.

For complete information on how the ROTOBLAST method (utilized in special machines, tables, barrels) can improve *your* cleaning—by saving time, producing cleaner metal, facilitating inspection and finishing—write to Pangborn, *world's largest manufacturer of blast cleaning and dust control equipment*. Pangborn Corporation, 1300 Pangborn Boulevard, Hagerstown, Maryland.

*Trademark of the Pangborn Corporation

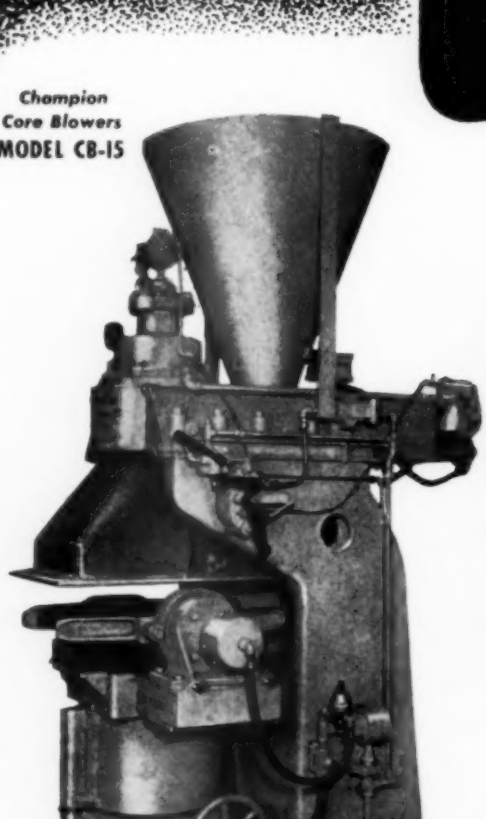
Illustration at right: 600 PER 8-HOUR DAY! Six truck wheel castings are placed on hook and carried by monorail into blasting chamber. Castings pass through the blast streams of four strategically-placed ROTOBLAST wheels, the monorail halting and the hook revolving the work in front of the blast stream.

FOUNDRYMEN from Coast to Coast

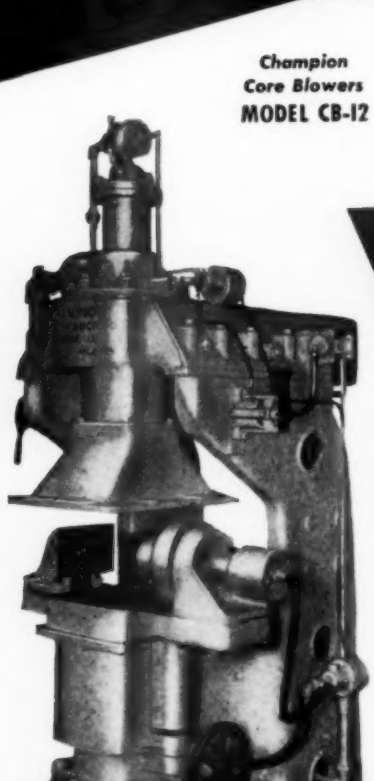
are thrilled by

CHAMPION "Know How"

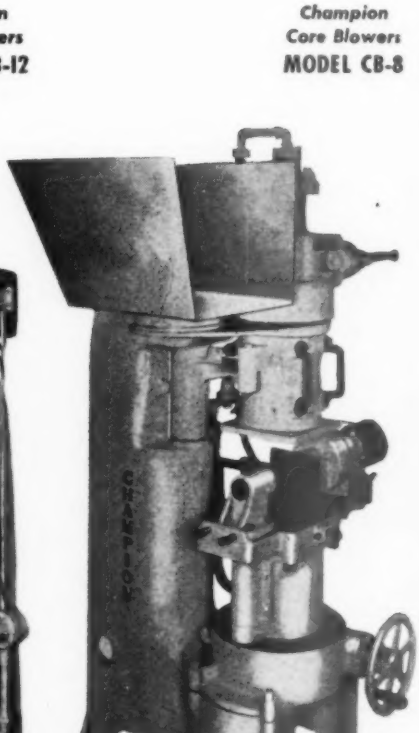
Champion
Core Blowers
MODEL CB-15



Champion
Core Blowers
MODEL CB-12



Champion
Core Blowers
MODEL CB-8

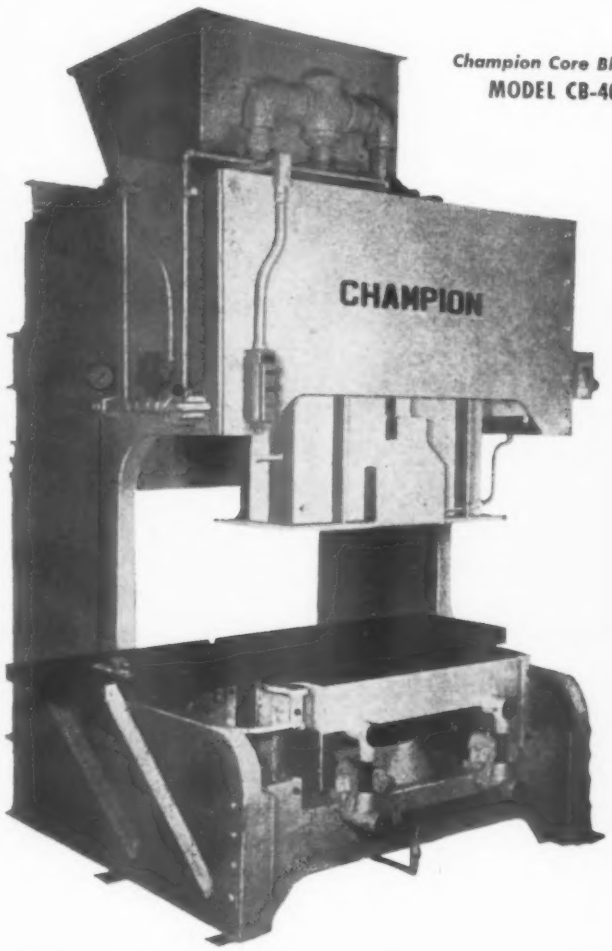


Performance under the stress and strain of today's demand for accelerated production of perfectly rammed cores is the test of a true Champion—a top-notch tool with the "know how" or "savvy" to remove all guesswork.

That is how a Champion Core Blower performs for the least experienced operator. Any man or woman—boy or girl can produce perfectly rammed cores on a Champion Core Blower by merely setting the box and pulling the lever. In a single second small or large cores are perfectly rammed. The working table is completely accessible with no obstructions, so that cores are produced faster, more economically and more accurately without need for highly trained labor.

A single valve operates the core box clamp, clamps same against the blow plate, blows the core, exhausts and releases the clamps in the proper cycle. Rigid one-piece, cast steel frame insures accurate alignment of core box and blow plate. Patented Air-Operated Hydraulic Clamp locks the core box securely against split box separation.

Champion Core Blowers could be the answer to that most puzzling problem of man-power.



Champion Core Blowers
MODEL CB-400

CHAMPION
FOUNDRY & MACHINE CO.
1318 West 21st Street Chicago 8, Illinois

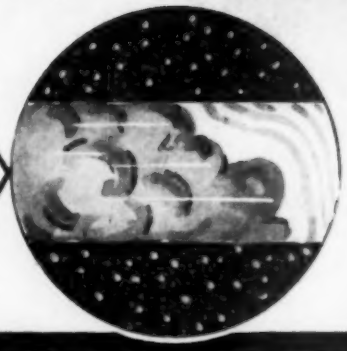
Here's IMPORTANT News...

To Every Grey Iron, Malleable and Semi-Steel foundry . . .

. . . FOR FASTER PRODUCTION OF FINER, SMOOTHER CASTINGS

use DELTA BLACKOAT CORE AND MOLD WASH

Molten metal flows rapidly and uniformly over BLACKOAT washed surfaces insuring smoother, more perfect castings.



The normal flow of metal over unwashed surfaces is turbulent, resulting in rough, imperfect castings.

IT'S CHEMICALLY ACTIVE!

Molten metal flows rapidly and more uniformly over BLACKOAT washed surfaces and, due to a newly developed chemical additive in the wash, metal set-up is quicker and sand expansion reduced to a minimum.

BLACKOAT eliminates sand-metal adhesion and insures finer finished casting surfaces.

Write for further details.

DELTA OIL PRODUCTS CO.

MANUFACTURERS OF FOUNDRY PRODUCTS, INDUSTRIAL AND AUTOMOTIVE OILS, GREASES AND COMPOUNDS

MILWAUKEE 9, WIS., U. S. A.

SAVE
EXTRA HANDLING!

USE CMD *DUAL-PURPOSE CORE TRAYS*

The CMD Dual-Purpose Core Tray can be used for baking the cores, thus eliminating transfer of cores from core plate to core tray.

Because of their lock-stacking features, these trays make possible storage from the floor up. Bins and racks are no longer necessary.

SPECIFICATIONS

SIZE—12" X 24"

LOADING HEIGHT—4½"—6" OR 7"

OVERALL HEIGHT—5½"—7" OR 8"

WEIGHT—9½ POUNDS

MATERIAL—16 GA. SHEET METAL

SPOT WELDED (28 POINTS)

ALL ROUNDED CORNERS

2 BOTTOM REINFORCEMENT ANGLES

CONSTRUCTED FOR STACKING

CHICAGO MANUFACTURING & DISTRIBUTING CO.

Dept. 5F, 1928 West 46th St. CMD **• • Chicago 9, Illinois • •**

HERMAN BUILDS *the*...

Installation at Youngstown Alloy Casting Corp., includes 20 vertical ty po casting machines located in pits in two rows of five each, and one row of eig ht machines.

MODERN casting production by centrifugal methods requires a machine of considerable versatility to meet varying conditions.

The Herman Hydro-Centrifugal Casting Machine provides a step-less range of rotative speeds by means of hydraulic flow control, high production, extremely simple operation, overload protection, low maintenance, and a maximum of safety.

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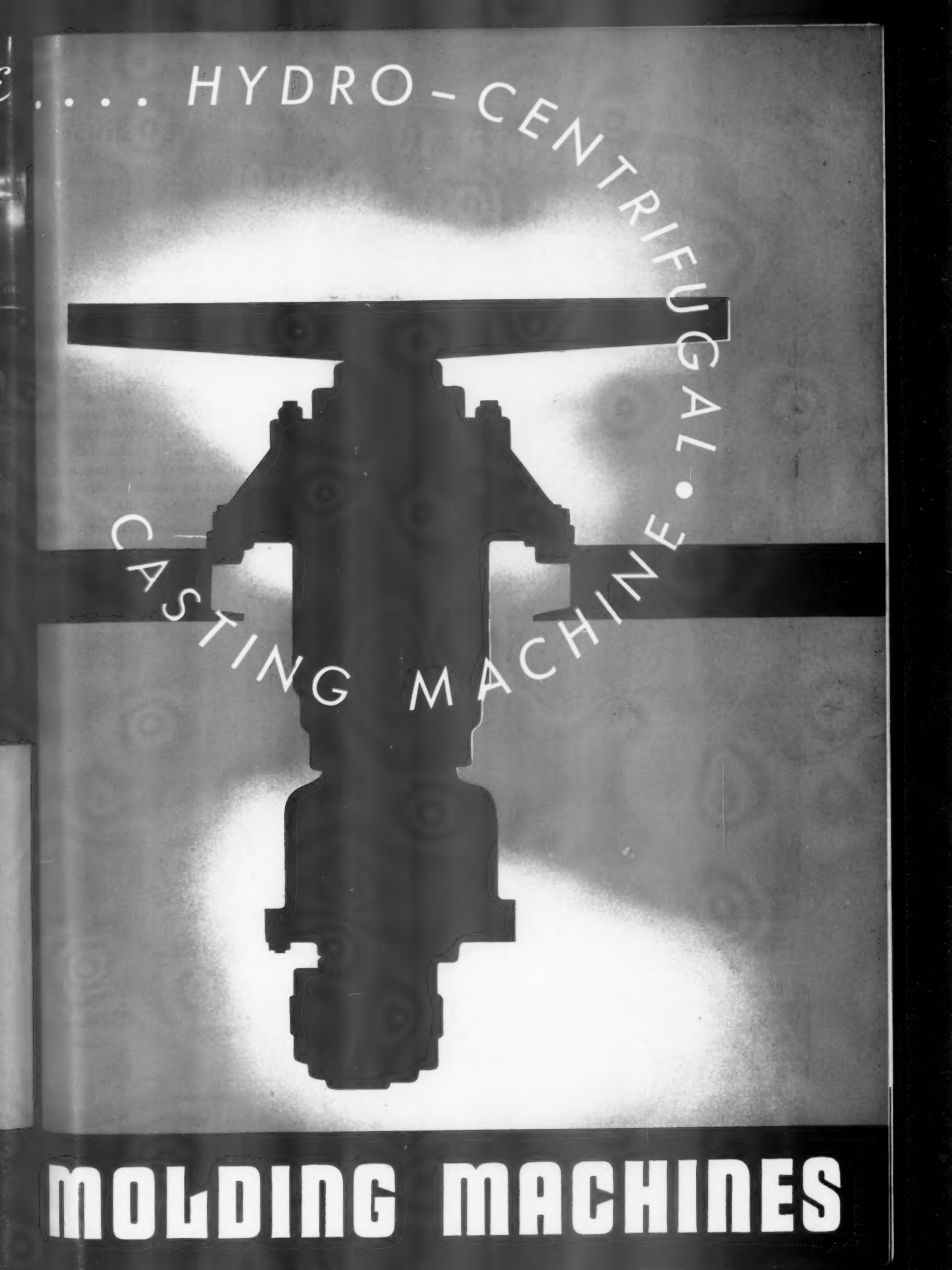
HERMAN PNEUMATIC MACHINE CO.
UNION BANK BUILDING, PITTSBURGH 22, PA.

HERMAN


. . . . HYDRO-CENTRIFUGAL • ENGINE
CASTING MACHINE
MOLDING MACHINES

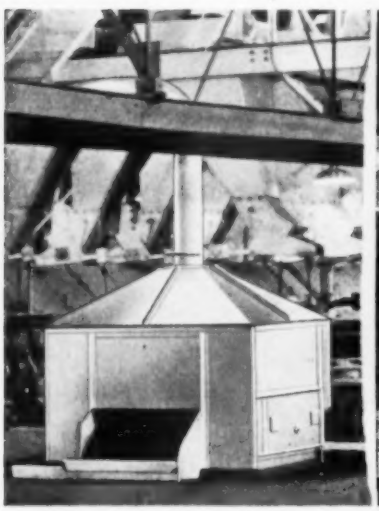
THE ANSWER TO SHAKEOUT DUST CONTROL

MEMBER

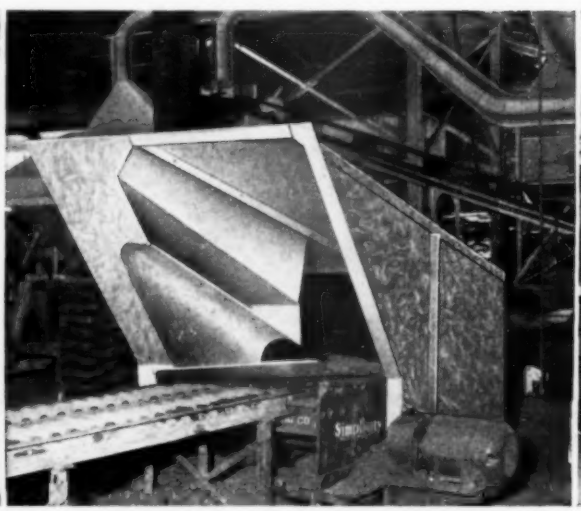
Type W Roto-Clone in automotive foundry; a size of flask and use of mold conveyor permit installation of overhead hood above shakeout.

● AAF - engineered side hoods exhausted by Type W Roto-Clones offer the most practical method of dust control for foundry shakeouts. Many ingenious hood arrangements have been developed to take care of dust and fumes without interfering with the shakeout operation. The type W Roto-Clone has proved most satisfactory for this service because it successfully collects the extremely fine dust and is not affected by steam or vapor contained in the exhaust air.

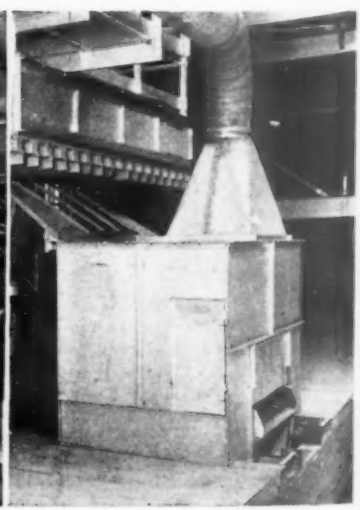
For complete information on Roto-Clone for every foundry dust problem, send for Bulletin No. 274A.



Complete enclosure; applicable with automatic handling of molds.



Combined side and overhead hood with hinged top permits use of crane; underground duct to Roto-Clone.



Semi-Enclosure; open front permits handling of molds by operators.

ANOTHER AAF PRODUCT

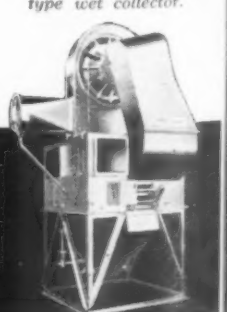
AMERICAN AIR FILTER COMPANY, INC.

INCORPORATED

266 Central Avenue — Louisville 8, Ky.

In Canada: Darling Bros., Ltd., Montreal, P. Q.

*Roto-Clone is a registered trademark for a dynamic precipitator or hydrostatic baffle-type wet collector.



ROTO-CLONE

FOR FOUNDRY DUST CONTROL

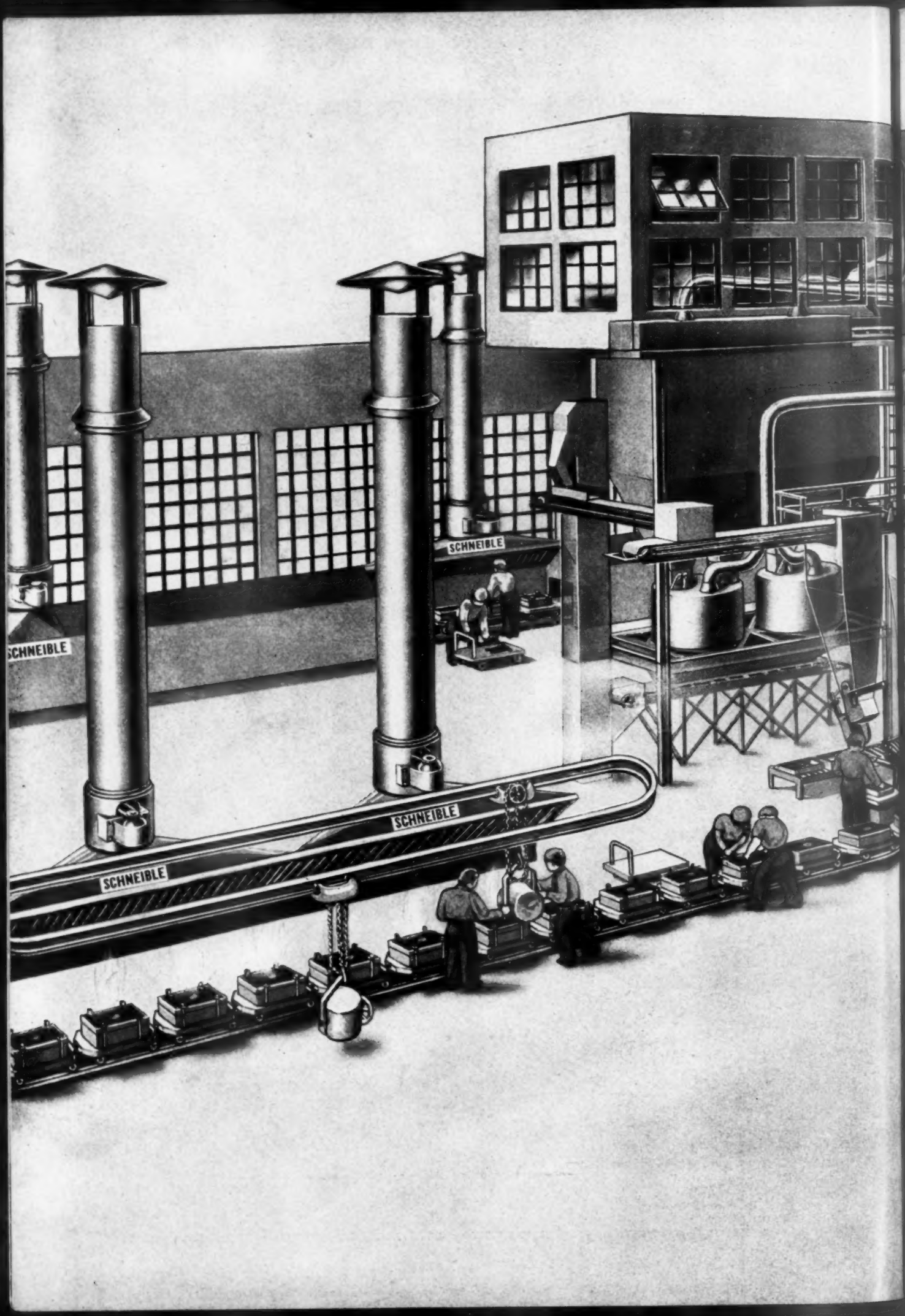
Federated — MODERN HEADQUARTERS FOR NON-FERROUS METALS

TECHNICAL SERVICE—The engineering materials produced by modern smelters such as Federated are widely distributed to metal fabricators throughout the country. The problems of these diversified industries are manifold. Where metal problems are concerned, the services of Federated research engineers, metallurgists, and chemists are available to industry. Federated also employs service engineers who are in daily contact with metal users to assist in the solution of their problems. The services of these engineers are available without cost to you. This is your engineering staff, working for you, to make your products top quality.

FEDERATED METALS DIVISION
American Smelting and Refining Company
120 Broadway, New York 5, N. Y.
Nation-wide service with offices in principal cities

FMD *Federated*

ALUMINUM • BRASS • BRONZE • BABBITT • DIE CASTING ALLOYS • LEAD PRODUCTS • SOLDER • TYPE METAL • ZINC DUST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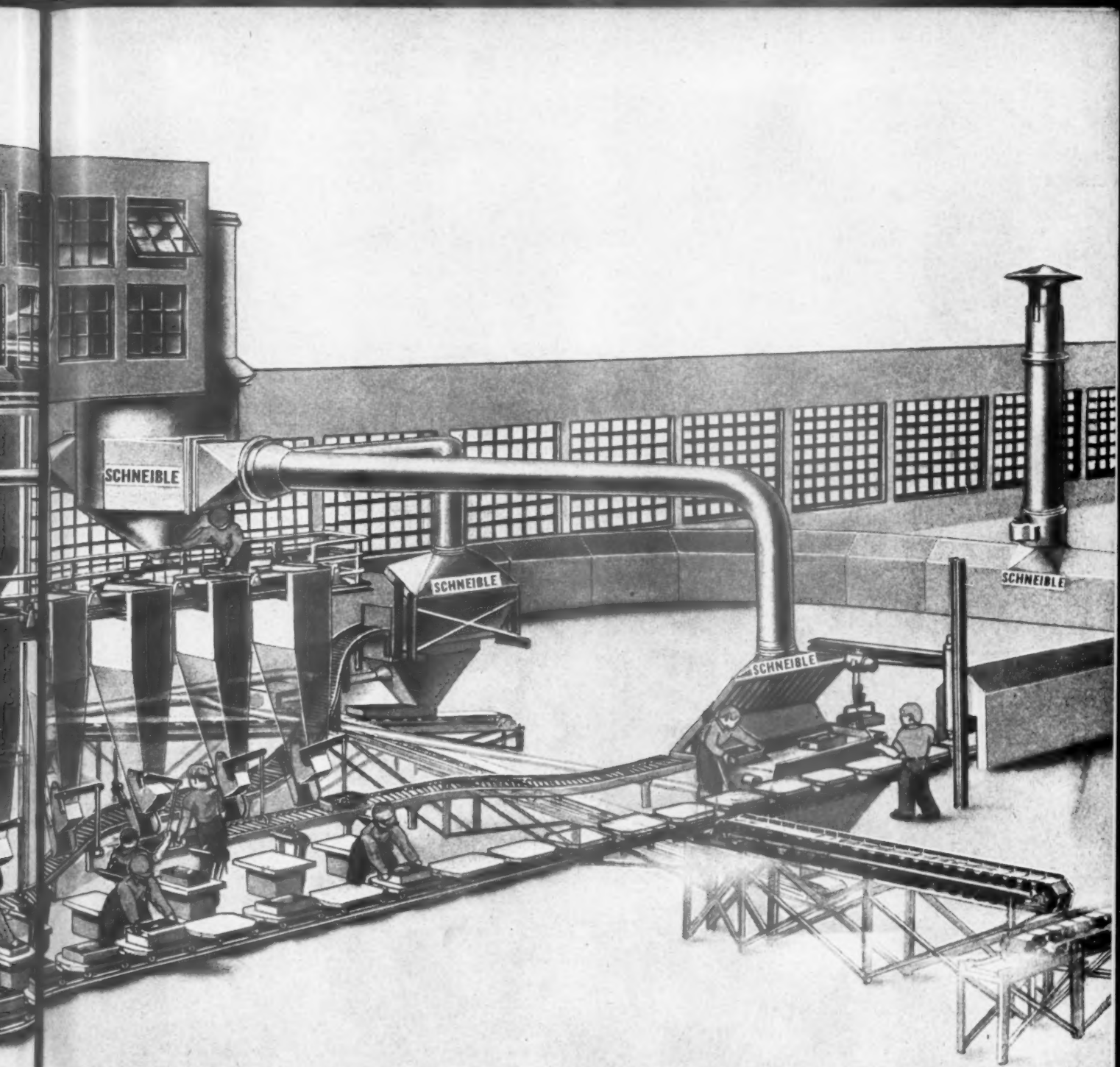


Foundry Ventilating and Dust Collecting Systems By Schneible

CLAUDE B. SCHNEIBLE CO.

2827 Twenty-Fifth St., Detroit 16, Mich.

Engineering Representatives in Principal Cities

A picture and a letter speak volumes for KELLER AIR HOISTS

It is gratifying to us when a great company pays tribute to a Keller-engineered tool. The accompanying letter relates what a Keller portable air hoist can be depended upon to do in service. Their power, lightweight, and variable speed features "pay off" in fast-moving assembly lines, foundries, shipping departments, machine shops—in fact, wherever loads have to be lifted and lowered.

Keller Air Hoists now available in capacities of ¼ ton, ½ ton, and the newest size for light loads up to 300 lbs.

Ask for illustrated folder... it fully describes the hoist.

PEERLESS PUMP DIVISION
FOOD MACHINERY CORPORATION

301 WEST AVENUE TWENTY SIX
LOS ANGELES 31, CALIFORNIA

January 11, 1946

Keller Tool Company
Grand Haven, Michigan

Gentlemen:

... The illustration shows one unit in operation facilitating the easy handling of a heavy Peerless Moturbo Housing Assembly where head-space and wall-clearance is quite limited.

The portability, low hook-to-hook dimensions, and variable speed features make the Keller Air Hoist a utility tool of unusual adaptability on our assembly lines.

Yours very truly,
J. K. Ruscher

J. K. Ruscher

KELLER
Pneumatic Tools

KELLER TOOL COMPANY • 4611 LAKE STREET • GRAND HAVEN, MICHIGAN

TOP HEATING EFFICIENCY FOR PERMANENT MOLD CASTING

Courtesy of Eastern Casting Corp., Newburgh, N. Y.

Holding Furnaces

Melt-down Furnaces

Fisher QUICK HEATING HOLDING FURNACES

Economical and uniform *permanent mold castings* account for nearly ⅓ of all aluminum castings made, although only about 7% of aluminum foundries use this process. Obviously, then, permanent mold casting calls for high production per man, per machine and *per furnace*. This essential *service efficiency* is assured to you with *FISHER Holding Furnaces* . . . especially designed for quicker heating and more accurate temperature control. Maximum productivity is obtained by hot charging from large Fisher Tilting Furnaces. Write for complete details and catalog.

5519 N. WOLCOTT AVE., CHICAGO 40, ILLINOIS

Fisher FURNACE COMPANY

Engineers and Manufacturers

MELTRITE

Such Preference MUST BE MERITED!

MORE USED THAN ANY OTHER MERCHANT PIG IRON

PICKANDS MATHER & CO.

CLEVELAND • CHICAGO • DETROIT • ST. LOUIS
ERIE • DULUTH • MINNEAPOLIS • TOLEDO

P M

IRON ORE • PIG IRON • COAL • COKE

ONE OF A SERIES OF STORIES ABOUT ALLOYING METALS . . . WHERE THEY COME FROM AND HOW THEY ARE USED

THE STORY OF COLUMBIUM

IN HONOR OF AMERICA

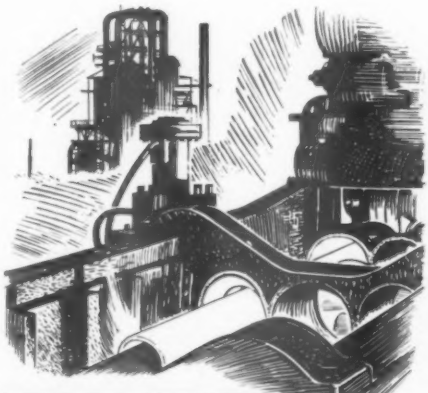
1 In 1801 the British chemist, Hatchett, discovered a new element and named it columbium, in honor of Columbia (America) whence came the mineral specimen he examined. For years this element seemed only an impurity in tantalum, but recently it has gained an important place in metallurgy.

NATIVE CONVEYOR BELT

2 From Nigeria in West Africa come the ores of columbium, one of the scarcer metals. Here, native labor digs and carries the ore by hand to a modern washing plant which separates the ore from the associated tin and tantalum ores. From the concentrates, Electromet makes ferrocolumbium.

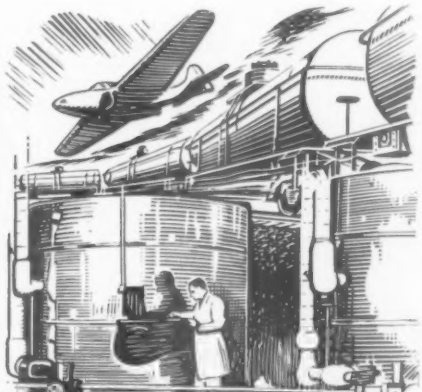
HEAT DOESN'T HURT

3 Columbium preserves corrosion resistance of austenitic chrome-nickel steel when heated to a high temperature. It is unnecessary to anneal welded equipment made of these steels. Fabricators may utilize forgings and castings of a size that could not be properly annealed by commercial methods.



TAKES PUNISHMENT

4 Columbium is essential for improving the creep strength of the super alloys for high-temperature applications such as blades and moving parts of gas turbines and jet propulsion engines. Columbium also reduces air hardening in the straight chromium steels, assuring ductility on cooling.



AID TO FABRICATORS

5 In chrome-nickel stainless steel equipment, welded without annealing, such as large tanks for the chemical, oil, and food industries, columbium preserves corrosion resistance. For high-temperature jobs, such as aircraft manifolds, columbium-bearing chrome-nickel steel is required.

Electromet Has Pioneered

. . . in the development and use of columbium and is the sole commercial producer of ferrocolumbium. If you seek new uses for your stainless or other alloy steels, or are faced with problems in their manufacture or fabrication, let our research staff work with you. Write to Electromet's Technical Service Department for the booklet "Electromet Ferro-Alloys and Metals." It will tell you more about columbium and other alloys and of our special service to metal producers and fabricators.

ELECTRO METALLURGICAL COMPANY

Unit of Union Carbide and Carbon Corporation

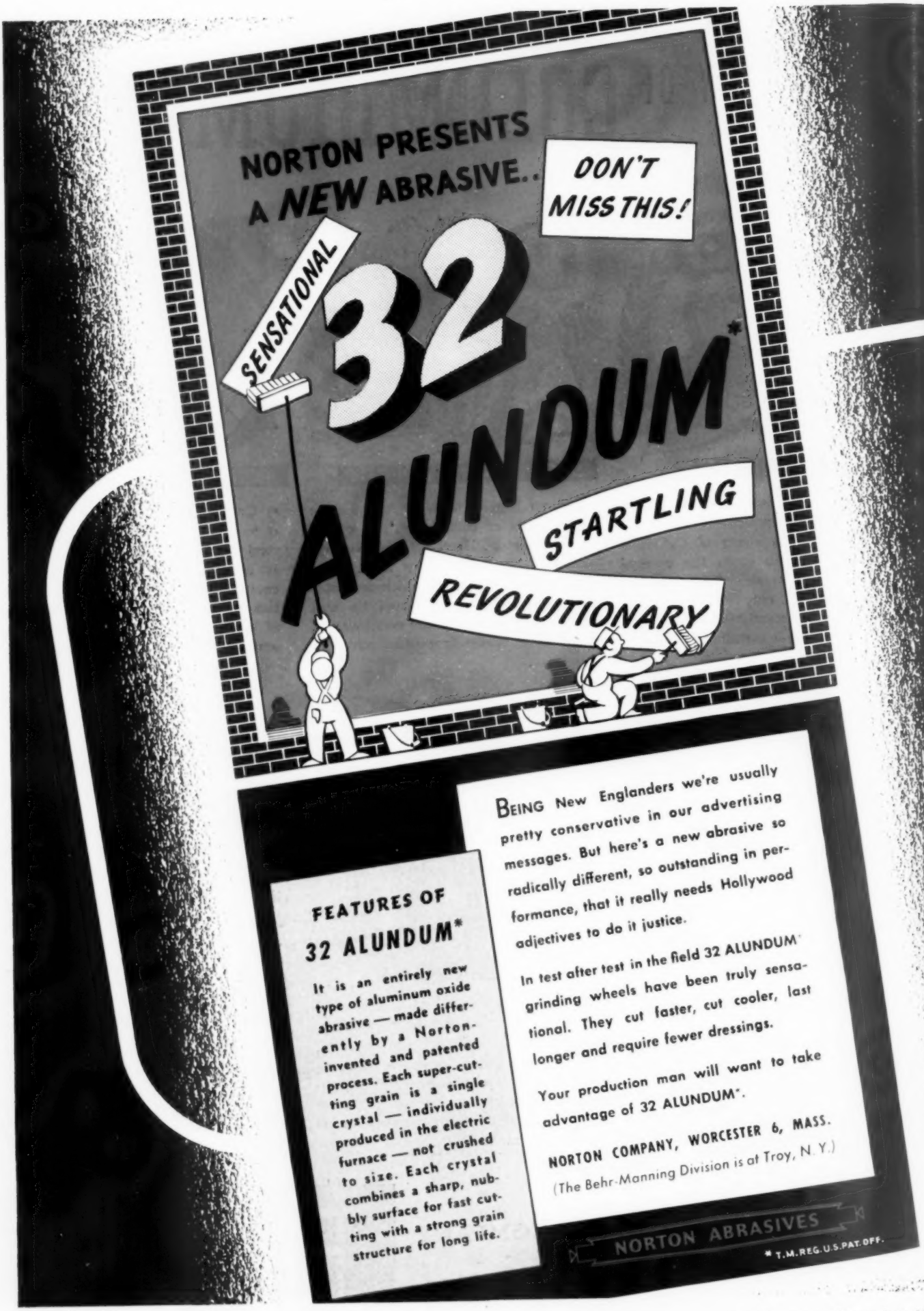
30 East 42nd Street UCC New York 17, N. Y.

ELECTROMET Ferro-Alloys and Metals are sold by Electro Metallurgical Sales Corporation, and Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

Electromet

TRADE MARK

Ferro-Alloys & Metals


NORTON PRESENTS
A NEW ABRASIVE..
DON'T MISS THIS!
SENSATIONAL
32
ALUNDUM*
STARTLING
REVOLUTIONARY
FEATURES OF
32 ALUNDUM*
It is an entirely new type of aluminum oxide abrasive — made differently by a Norton-invented and patented process. Each super-cutting grain is a single crystal — individually produced in the electric furnace — not crushed to size. Each crystal combines a sharp, nubbly surface for fast cutting with a strong grain structure for long life.
BEING New Englanders we're usually pretty conservative in our advertising messages. But here's a new abrasive so radically different, so outstanding in performance, that it really needs Hollywood adjectives to do it justice.
In test after test in the field 32 ALUNDUM* grinding wheels have been truly sensational. They cut faster, cut cooler, last longer and require fewer dressings.
Your production man will want to take advantage of 32 ALUNDUM*.
NORTON COMPANY, WORCESTER 6, MASS.
(The Behr-Manning Division is at Troy, N. Y.)
NORTON ABRASIVES
* T.M. REG. U.S. PAT. OFF.

Outstanding in the Foundry, too!

32 ALUNDUM GRINDING WHEELS are Making Remarkable Records

THE grains of 32 ALUNDUM abrasive are sharper than those of *any other abrasive* —because of the unique electric furnace process by which they are produced. This means that wheels of 32 ALUNDUM abrasive penetrate the work more easily—removing metal faster and with longer wheel life.

This sharper cutting action is especially advantageous with portable grinders, where only limited pressures can be applied. Operators find that *much less effort* is required to do more work with 32 ALUNDUM grinding wheels.

Used with the new Norton B-5 and B-7 resinoid bonds for high speed operation and with vitrified bond for regular speed, 32 ALUNDUM wheels are showing sensational results. Ask your Norton abrasive engineer about them—also for a Vectograph demonstration.

Cut Faster

Cut Cooler

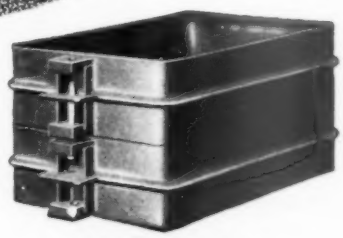
Fewer Dressings

Longer Life

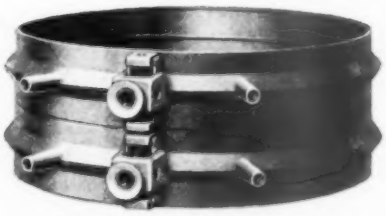
NORTON ABRASIVES

HOOT MON — I save with Sterlings!

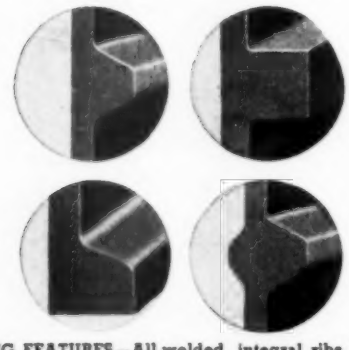
If it's real economy you are after, it will pay you to standardize on Sterling Steel Flasks. For Sterlings have the strength and rigidity to withstand tremendous pressures, year-in and year-out. Engineered on standards of indestructability, Sterlings resist distortion and retain their accuracy under the toughest production schedules. They last longer. That's why they cost less. So, decide now to economize in YOUR foundry. Buy long-life Sterlings. You'll find they reduce flask-hour costs to rock bottom.



STYLE "A" FLASK
with Double Pin Lugs



STYLE "BLT" with Trunnions and Two-man Lift Handles.



STERLING FEATURES—All welded, integral ribs and flanges; solid center reinforcing rib; square flanges; full-width bearing. Simplifies ramming and shaking out. Speeds up molding.

STYLE "¾ NNT"
Heavy Duty Flask
(Pat. 1974292)

Sterling FOUNDRY FLASKS

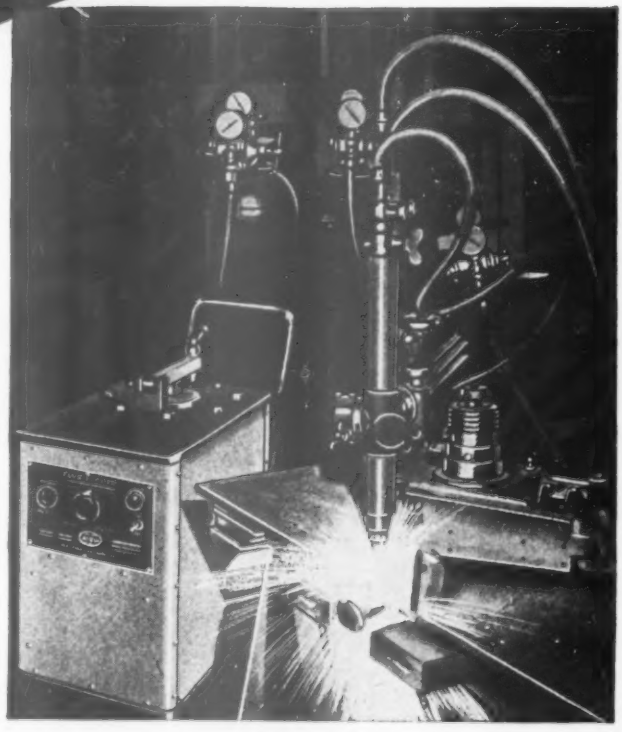
STERLING WHEELBARROW COMPANY • MILWAUKEE 14, WIS., U. S. A.

A 5061-1P

Still looking into the Future

YESTERDAY... ***Punch, snip or melt ... a grueling grind for the cutting of Stainless Steels***

Yesterday cutting stainless steel by melting-away or shearing was slow...costly...and with the carbon arc the resulting surfaces were rough and unsightly.



TODAY... ***It's the oxyacetylene flame for production cutting of Stainless Steels***

Today, Airco's new Flux-Injection Method of stainless steel cutting is time-saving and economical. With this new process, stainless steels with alloying elements as high as 50% can be oxyacetylene flame cut as readily as ordinary steels. Used with Airco oxyacetylene equipment, this new method keynotes simplicity and economy. In fact, operating conditions and instructions for stainless steel cutting approximate those for mild steel, and "cut speed" is comparable.

AND TOMORROW . . . ?

Airco's research and development staff will continue to work in this and other fields of metal working to contribute new and better oxyacetylene flame methods... creating the techniques and tools of tomorrow. Moreover, the facilities of our Technical Sales Division are available to all metal working men in applying Airco processes to the solution of their problems.

For more information about stainless steel cutting, write for a copy of "Flux-Injection Method Brings Economies of Oxyacetylene Flame Cutting to Stainless Steel". Address your nearest Airco office, or write: Air Reduction, General Offices, 60 East 42nd Street, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, General Offices, Houston 1, Texas.

AIRCO **AIR REDUCTION**

Offices in All Principal Cities

ORIGINATORS OF MODERN OXYACETYLENE METHODS FOR THE METAL WORKING INDUSTRY

the Simpson Mixer is

— says Banner Iron Works, referring to the sand conditioning system they designed, built and installed in 1943, under the very able direction of Mr. W. E. Illig

Banner Iron Works

FABRICATED STEEL PRODUCTS
GRAY IRON CASTINGS
MECHANITE METAL CASTINGS

4560 SHAW BOULEVARD

Saint Louis 10 August 21st, 1946

National Engineering Company
549 West Washington Boulevard
Chicago, Illinois

Attention: Mr. Webb L. Hammerer

Gentlemen:

During the defense program, we operated our foundry at approximately 400 tons a month with a #1 Simpson Muller which was purchased about 1910.

As the foundry demands for better mulled molding and core sands developed, and due to increased war production requirements, this small muller was forced to operate from 20 to 24 hours per day, and was still far below meeting the demands for properly conditioned sand. During 1940 a sand conditioning system was designed. This system was such that all of its various details had to function or the foundry could not operate. After some investigation, it was decided to purchase for this system, a #3 Heavy Duty Simpson Muller. The system was installed early in 1943. The equipment was originally designed to handle, the main bay, which requires about 100 tons; the side floor, 25 tons; and, two rollover machines, demanding about 100 tons, totaling about 225 tons daily. In addition to the main floor, heap and facing sands, core sand requirements are also prepared in this system.

After operating approximately a year on this basis, it was decided to condition the squeezer floor sand in the same system. The sand required for these floors is approximately 50 tons daily. As we use all synthetic mixes, all heap and facing sands pass through this system daily.

It goes without saying that the Simpson Muller is the heart of this system. In the event a defect occurred in the Muller, all molding operations would be forced to stop for want of sand as no sand is stored on the foundry floor. We are happy to say that we have had 3½ years of continuous operation, without shutdown, and that during this period, only a few minor repairs on the muller were necessary and, thanks to the service that the National Engineering Company gave us, we were able to make these minor repairs without interruptions in our molding operations.

Yours very truly,

BANNER IRON WORKS

W. E. Illig

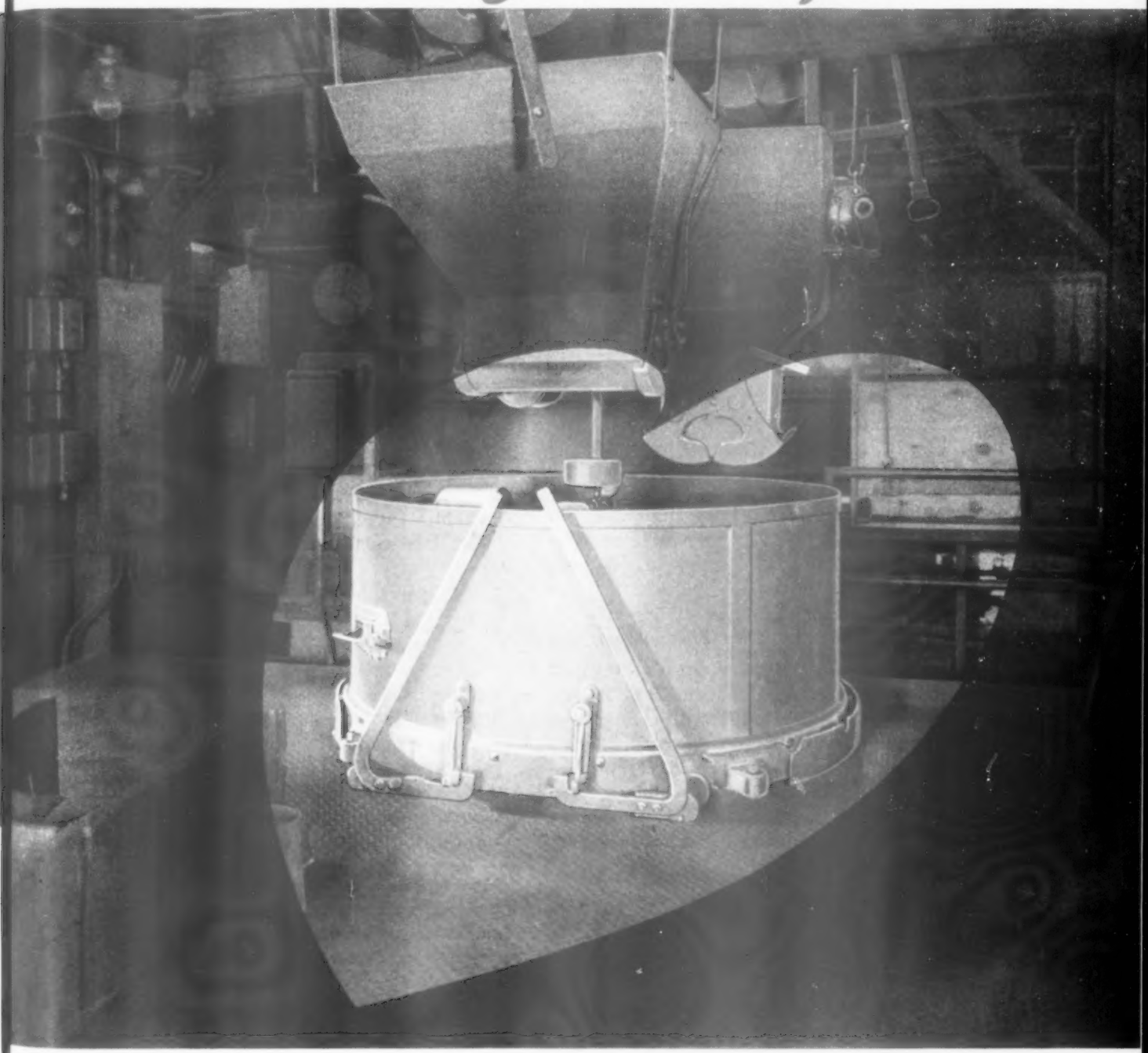
W. E. Illig
Vice President

- **The accompanying letter is indicative of the way in which Simpson Mixers are meeting foundry demands for a greater production of better quality molding and core sands . . . day after day, year after year.**

This evidence of superior performance is not an isolated case. On-the-job reports in foundries both large and small prove that Simpson Mixer installations are constantly producing foundry sand better, faster and at less cost.

Ask a National Engineer to discuss the details with you.

the heart of this system



• Illustrated here is the No. 2 Simpson Mixer referred to as the "heart" of the sand conditioning system at the Banner Iron Works foundry, which has now had 3½ years of continuous operation without shut-down.

MANUFACTURER'S ASSOCIATION INC. FOUNDRY EQUIPMENT

NATIONAL ENGINEERING COMPANY

MACHINERY HALL BUILDING • CHICAGO 6, ILLINOIS

Manufacturers and Selling Agents for Continental European Countries—The George Fischer Steel & Iron Works, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia—August's Limited, Halifax, England. For Canada—Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand—Gibson, Battle & Co., Pty., Ltd. Sydney, Australia

CASTINGS PLANT

FOR SALE or LEASE

GOVERNMENT OWNED SURPLUS PLANTS

Birdsboro, Pennsylvania (Nobs-105)
Birdsboro Steel Foundry and Machine Co.

These facilities were installed for producing castings and can be converted to peacetime production. They are offered for disposal, subject to the rights of the former lessee.

▲ ▲

LOCATION:

Approximately 8 miles southeast of Reading, Pennsylvania, in the town of Birdsboro at the plant of the lessee. This facility includes approximately 6⅛ acres.

TRANSPORTATION:

Railroad sidings connect with main line railroad. City streets lead to State Highways Nos. 82 and 83.

BUILDINGS:

There are 3 main buildings totaling approximately 105,600 sq. ft. These buildings are:

(1) FINISHING, CLEANING AND ANNEALING BUILDING, 302′ x 172′ with 57′ x 150′ and 58′ x 123′ leantos. Total building area approximately 65,500 sq. ft. Reinforced concrete foundations, steel columns and trusses, brick walls with metal sash and protected metal sidings. Precast concrete plank and slab roof. Two monitors with steel sash.

(2) PATTERN STORAGE BUILDING: 549′ x 60′ approximately 32,900 sq. ft. Steel frame with prefabricated side panels and interlocking steel roof.

(3) OFFICE BUILDING: 146′ x 50′ containing approximately 7,200 sq. ft.

Also a **LABORATORY BUILDING:** 63′ x 40′ with approximately 2,600 sq. ft.

EQUIPMENT:

Car type and pit annealing furnaces, sand blast room with dust collecting and ventilating equipment, hydraulic presses, forges, welding machines, grinders, lathes, drill press, gasoline locomotive, five (5) cranes (10-50 ton capacity) hoists, laboratory equipment, etc.

UTILITIES:

Furnished complete by local companies.

• • •

Further information is available in the Philadelphia Office of the War Assets Administration. Listing of this plant by name of lessee is for identification only, and has no connection with the lessee's own facilities. Information contained herein is not intended as a basis for negotiation.

War Assets Administration reserves the right to reject any or all proposals. These are to be sealed and submitted in duplicate with the following notation in the lower left hand corner of the envelope: "Sealed Proposal — Project: Navy Nobs-105." Preferential treatment will be given to the plant needs of small business.

Address all inquiries and proposals to:

WAR ASSETS ADMINISTRATION

OFFICE OF REAL PROPERTY DISPOSAL

1528 Walnut Street Philadelphia 2, Pennsylvania

762

This large pressure vessel casting—in which absolute soundness was of vital importance—is but one more in an imposing list of large and intricate shapes which have been successfully produced with Republic CHATEAUGAY—the low phosphorous, copper-free pig iron which consistently out-performs other irons.

Because it maintains its fluidity, CHATEAUGAY fills molds completely. It sets quickly . . . produces sound castings which are consistently uniform in grain structure and cross section density, regardless of size.

Moreover, these castings, though tough and strong, have very good machining qualities. They can be milled, drilled, turned and otherwise machined easily and economically.

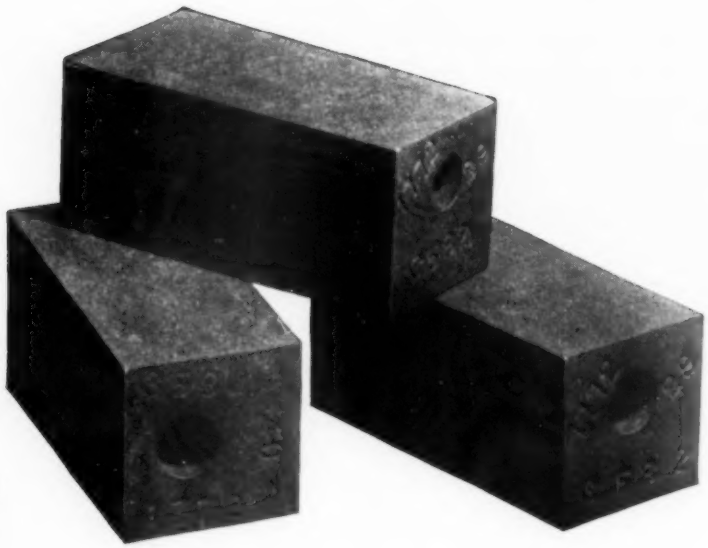
There are other profitable reasons, too, why it will pay you to investigate and determine the possible applications for Republic CHATEAUGAY in your foundry. Republic Pig Iron Metallurgists—men with years of practical foundry experience behind them—are ready at any time to help you. Write to:

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Bldg., New York 17, N.Y.

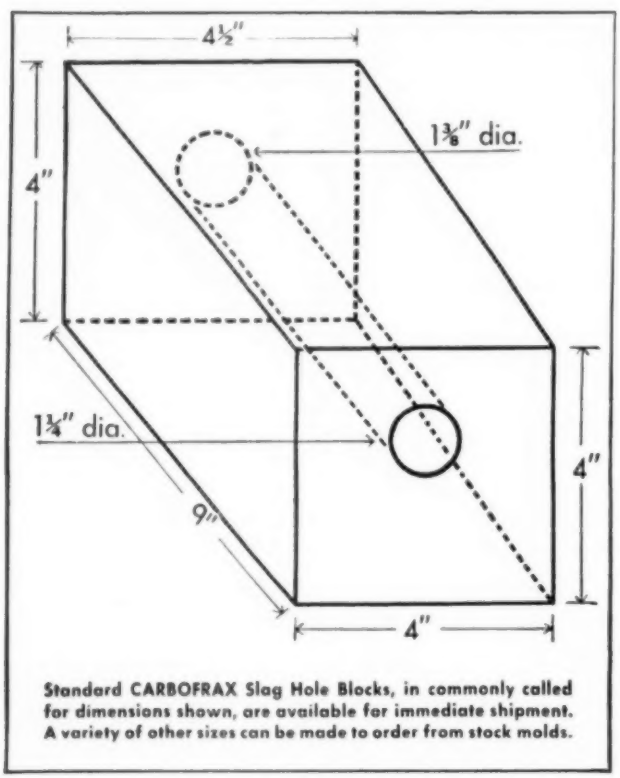
Republic PIG IRON

"CHATEAUGAY"	"REPUBLIC"	"PIONEER"
Low-Phosphorus, Copper-Free	(Northern) Foundry, Basic and Malleable	(Southern) Foundry and Basic

ALSO TRUSCON FOUNDRY FLASKS—REPUBLIC CORE WIRE—FOUNDRY NAILS



No Costly Shutdown with these Slag Hole Blocks on the job



Standard CARBOFRAX Slag Hole Blocks, in commonly called for dimensions shown, are available for immediate shipment. A variety of other sizes can be made to order from stock molds.

In continuous-pour cupolas, using CARBOFRAX silicon carbide blocks eliminates slag hole block replacement during a run.

These dense, durable blocks retain their uniform hole size. For as long as 18 to 24 hours of steady operation, there is no enlargement of this opening. Even when the blast is on, rapid cutting away of the hole is effectively resisted. The slag stream remains practically constant. Particularly resistant to slag erosion at high temperatures, CARBOFRAX blocks successfully avoid expensive delays for slag hole replacement.

Orders for standard size blocks, as shown in the diagram, can usually be shipped from stock. Moulds are on hand to produce most other sizes required. More detailed data may be obtained by writing Dept. L-116, The Carborundum Company, Refractories Division, Perth Amboy, New Jersey.

CARBOFRAX Slag Hole Blocks

BY CARBORUNDUM

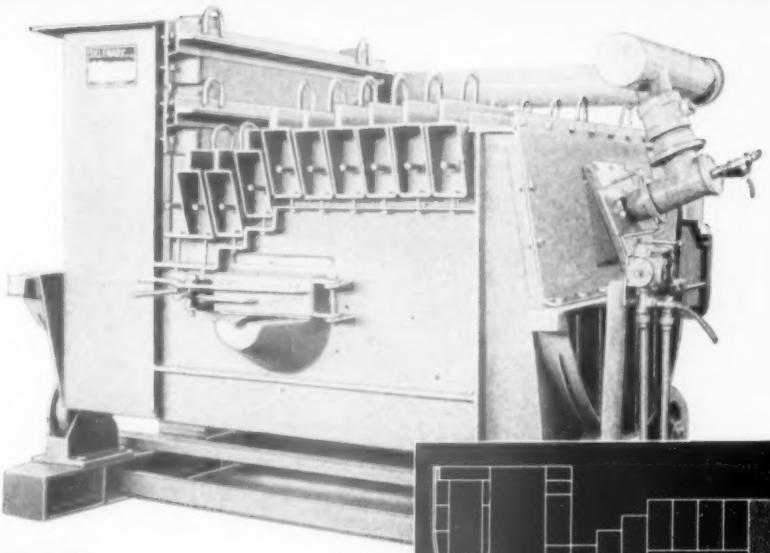
TRADE MARK

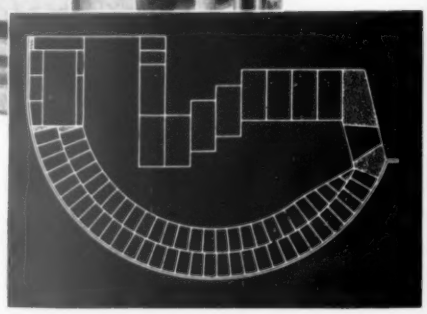
"Carborundum" and "Carbofrax" are registered trademarks which indicate manufacture by The Carborundum Company

Speed + STAMINA = STROMAN FURNACE PERFORMANCE

SKLENAR FURNACES

For Melting Brass, Bronze, Aluminum, Sklenar Non-Crucible, Direct Fired, Improved Reverberatory Melting Furnaces are the fastest melting furnaces built. Their design is unique. Metal is charged into a hopper which is also an exhaust from the combustion chamber. Here metal is preheated and melted at the throat of the hopper. Cold metal does not reach the molten bath. Charging is continuous. These furnaces will show fuel savings up to 40%; as the combustion chamber is heated by the same fuel used to melt metal in the throat of the hopper. They are also very successful in the making of Grey Iron Castings. The furnace Illustrated is the 1000 lb. size, and is oil fired. Gas fire is also available. Full information upon request.





STROMAN MANUAL TILT CRUCIBLE MELTING FURNACES

For Brass, Bronze, Aluminum

This illustrates a gas fired unit with two gas burners. Accessories for the mixing of gas and air in correct proportions are also shown and are furnished with the unit. This is the most modern and efficient means of burning gas that is known today. Furnaces up to and including No. 100 crucible are equipped with one gas burner. Larger sizes are furnished with two burners.

STROMAN CRUCIBLE STATIONARY MELTING FURNACES

For Brass, Bronze, Aluminum and other non-ferrous metals

Sturdy, efficient and featuring the Stroman Push-Back Cover, these stationary furnaces are designed for peak production and greatest fuel economy. Oil or Gas Fire. Capacities from No. 20 to No. 400 Crucible.

Write immediately for full information TO NEW ADDRESS

STROMAN STATIONARY CRUCIBLE MELTING FURNACES

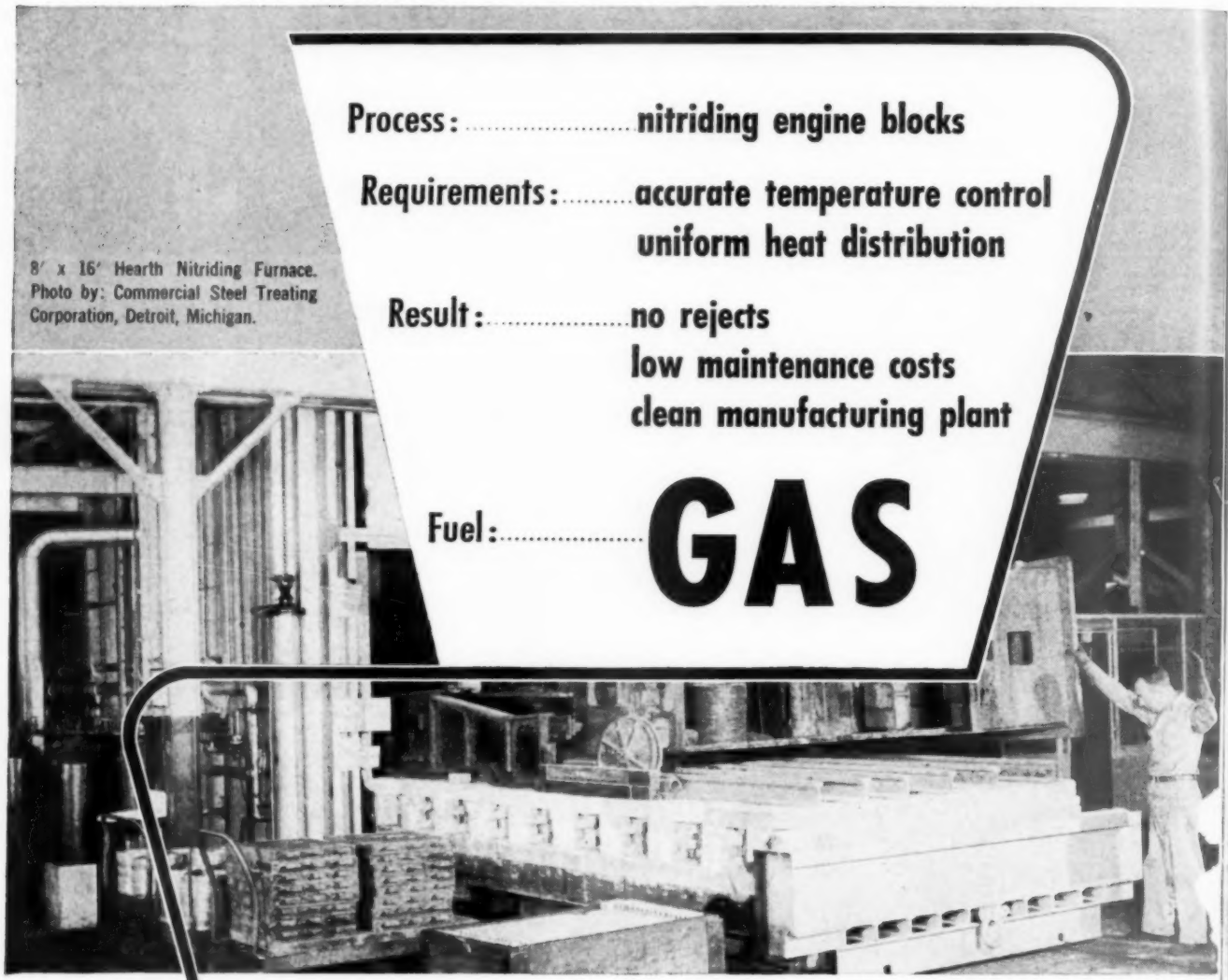
For Aluminum and other White Metal Alloys

These furnaces are designed primarily for use in permanent mold and die casting plants. They are equipped with a special shield to protect operators against excessive heat . . . are most efficient in operation . . . and handle capacities from 200 to 820 pounds of Aluminum. They may also be used as holding or breakdown furnaces. Oil or Gas fired.

STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. • 9900 FRANKLIN AVE. • FRANKLIN PARK, ILL.



8′ x 16′ Hearth Nitriding Furnace. Photo by: Commercial Steel Treating Corporation, Detroit, Michigan.

Process: ..... **nitriding engine blocks**

Requirements: ..... **accurate temperature control**
uniform heat distribution

Result: ..... **no rejects**
low maintenance costs
clean manufacturing plant

Fuel: ..... **GAS**

Capacity and product specifications for the GAS-fired furnace include:

- **Temperature** ..... **975 degrees F.**
- **Allowable Variation** ..... **±5 degrees F.**
- **Process Time** ..... **96 hours**
- **Case Depth** ..... **0.025 inches**
- **Atmosphere Supply** ..... **Ammonia**
- **Production Rate** ..... **200 Tons per Month**

Commercial Steel Treating Corporation demands accurate temperature control and uniform heat throughout the chamber of its heavy-duty nitriding furnace. GAS fulfills these requirements; five years of successful operation supply the proof.

GAS, dependable fuel for industrial processing operations, meets the most exacting control and heating requirements. Low maintenance costs and cleanliness characterize GAS-fired installations.

You will want to study facts and figures on the use of GAS in your construction or modernization planning. The Industrial Representative of your local Gas Company has a wealth of useful information. He's as near as your telephone; he knows the answers.

Visit the A.G.A. Combined Exhibit of
INDUSTRIAL GAS EQUIPMENT
17TH NATIONAL POWER SHOW
Grand Central Palace • New York City • December 2-7

AMERICAN GAS ASSOCIATION
420 LEXINGTON AVENUE, NEW YORK 17, N.Y.

MORE AND MORE...

THE TREND IS TO GAS

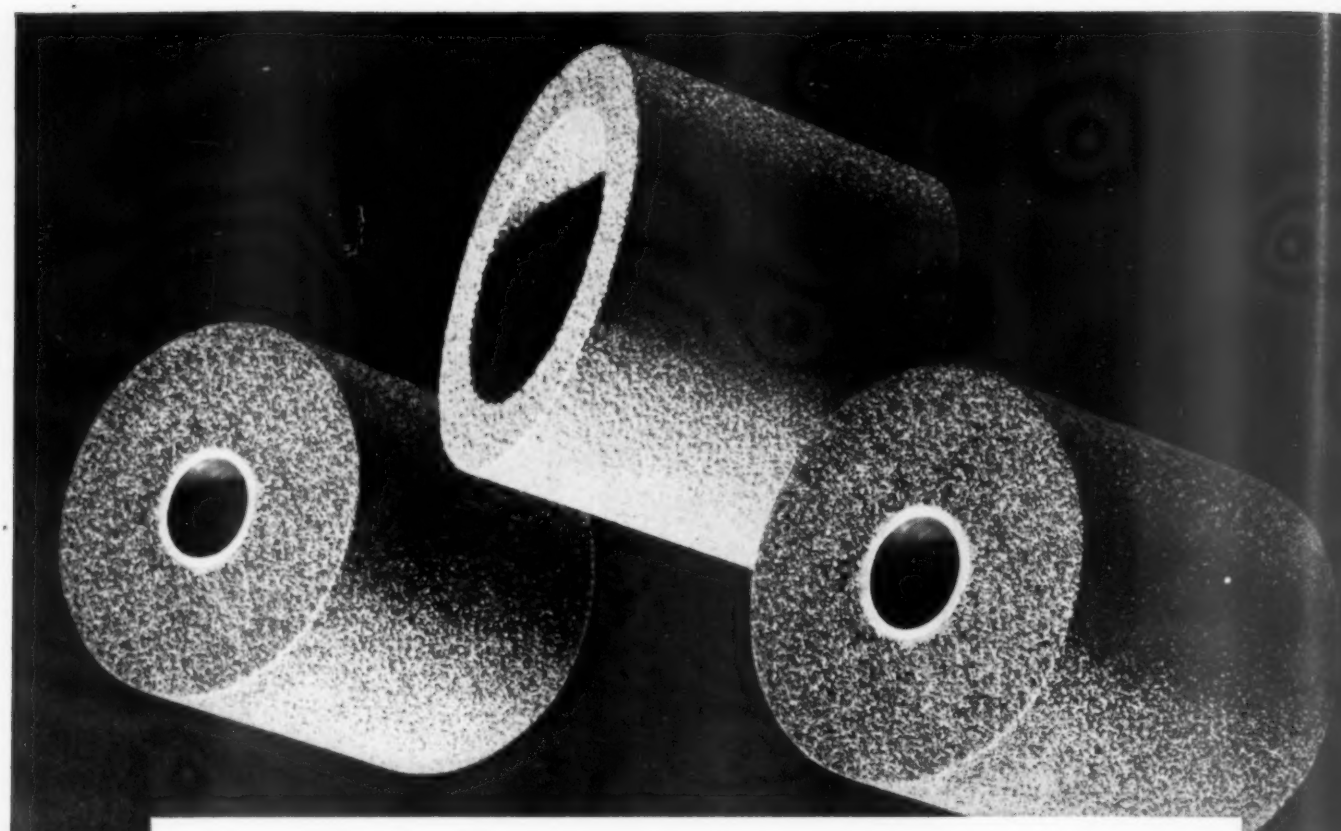
FOR ALL INDUSTRIAL HEATING

BIG! ... BUT NOT TOO BIG TO BE A BUFFALO PRECISION PATTERN

Look at the smooth machined surface of the pattern pictured above. Soon this big pattern — dimensionally accurate, machined to thousandths of an inch will produce low cost castings in volume for a leading manufacturer — with a minimum of scrap. Why not get the extra benefits of Buffalo's fifty years of "know how" with your next pattern regardless of size — no matter how intricate — write, wire, phone.

BUFFALO PATTERN WORKS

830 Hertel Avenue **Buffalo 16, New York**



Got 24 seconds to consider grinding?

Would you care to say right now that it is impossible to reduce your grinding costs?

If for any reason you doubt you could make that statement stick, we suggest a complete analysis of your grinding operations. Top production speed and low costs occur only when you use the correct wheels and machines for your particular work.

Call in Peninsular engineers. They will completely study your machines, your grinding methods, the metals you grind. From their findings, they will develop grinding wheels that get the kind of results you want.

Peninsular job-designed wheels can save money for you. *Every* Peninsular grinding wheel is specially made for its particular job.

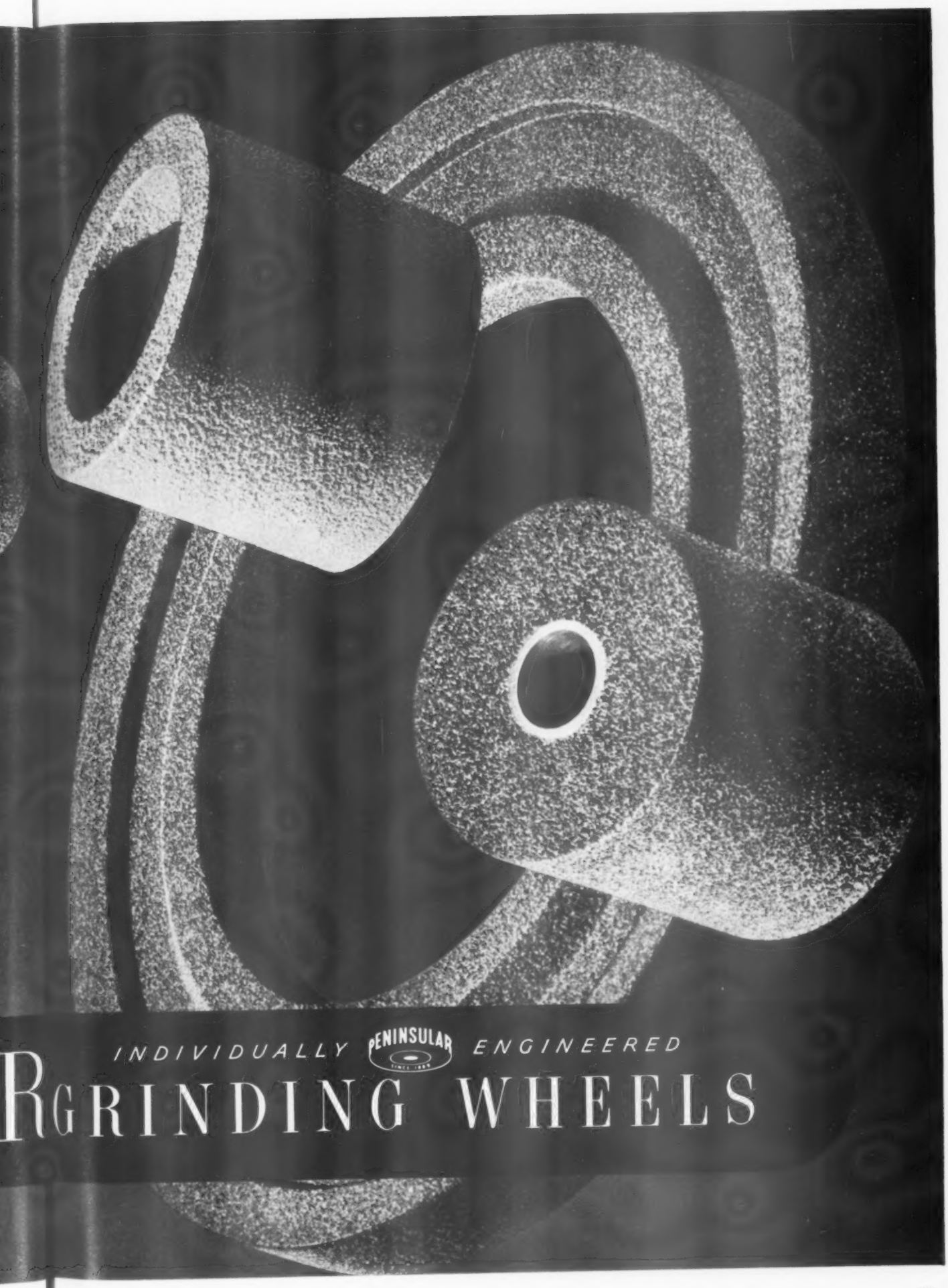
The Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7. *Sales Offices:* Chicago, Philadelphia, Boston, Buffalo, Cleveland, Newark, Pittsburgh, Houston, St. Louis, Cincinnati.

(End of 24 seconds reading time.)

PENINSULAR GR

SINCE 1889

SPECIALISTS IN RESINOID BONDED WHEELS


INDIVIDUALLY PENINSULAR ENGINEERED
GRINDING WHEELS

Never a Winner in this TUG O'WAR

There is always a simple way to do everything. Consider the installation and replacement of dust collector filter cloth for instance. When it takes a time-consuming tug o'war to install it in the first place and when shrinkage amplifies the job when it comes to replacement, then it's perfectly apparent that such a method is costly and uneconomical.

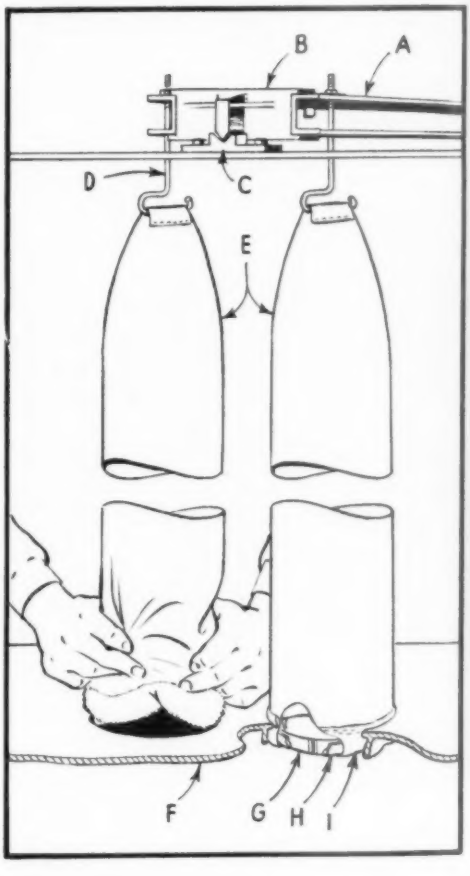
Dustubes, on the contrary, are unaffected by shrinkage or tight-fit. The tubes are always limp and loose. . . never under tension. One man, without tools, can install or remove a Dustube filter bag in less than thirty seconds. (See illustration)

But Dustubes save in many other ways such as these: (1) longer cloth life because there are no metal contacts to corrode or abrade the cloth; (2) tubes, being compact and light, are inexpensive to ship and easy to store; (3) ample spacing of tubes decreases resistance to air flow, saves power, and keeps air velocity uniform throughout the Collector; (4) shaking periods are shorter and cloth cleaning is more thorough, because dust is precipitated directly into a hopper, never upon other dust cells; (5) only the fine float dust ever reaches the tubes, never the coarse heavy particles that by-pass in some systems; (6) quick inspection of any tube without any dissembly whatever.

For other features of the Dustube, plus complete information on construction, specifications and other technical data, write for Catalog No. 72.

Dustube Filter Changed in only 4.6 seconds

This was the winning time set by Mr. W. Wilson, Gen. Fdry. Sup't. at Eclipse-Pioneer Division and Mr. R. F. Anderson, Engineer at General Electric Co. in our Dustube filter changing contest at the recent Foundry Show. The average time for the next 10 awards was 5.4 seconds.

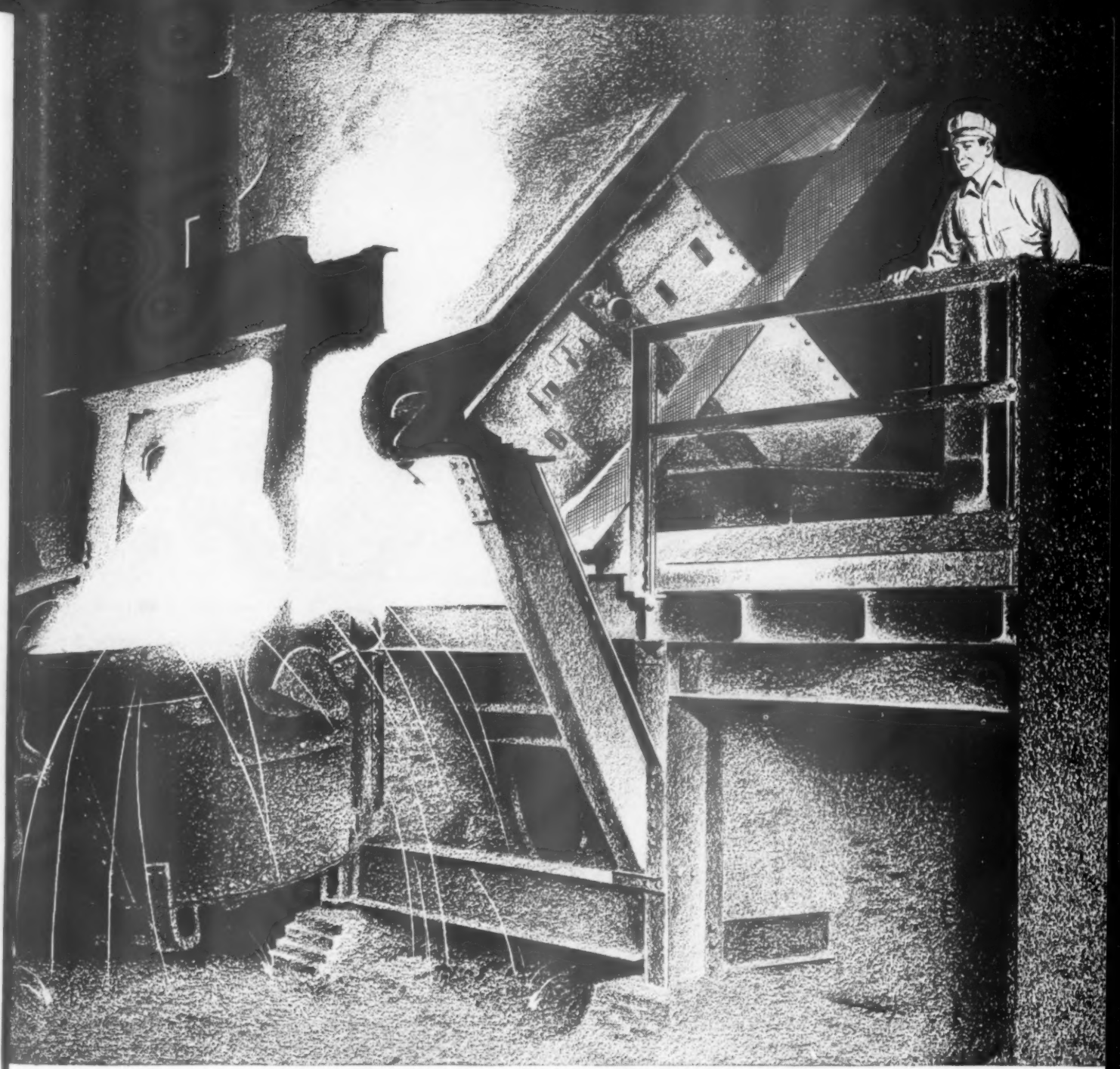


To install a Dustube bag simply collapse the lower end and insert in cell plate over dust hopper, then hang upper end on hook attached to shaker overhead. (A) Shaker Channel, (B) Shaker Channel Bracket, (C) Channel Bearing, (D) Tube Hook, (E) Dustubes, (F) Cell Plate, (G) Spring Steel Retainer, (H) Felt, (I) Flannel.

DUSTUBES
Cost less to Operate and Maintain

American
FOUNDRY EQUIPMENT CO.
[illegible] SOUTH BYRKIT ST. MISHAWAKA, IND.

dustube
DUST COLLECTORS



VANCORAM FERRO CHROMIUM

INSURES HIGH QUALITY CHROMIUM STEELS

Effective improvement in the quality of chromium steels is demonstrated beyond question by the use of Vancoram Brand Ferro Chromium. This alloy is offered in three grades, each made by modern electric smelting practice from carefully selected raw materials. Every step in its production is precisely controlled by experienced technicians, assuring an alloy of the required chromium content, low in impurities—a sound, uniform product that measures up to the most exacting standards. To meet your specialized needs, we offer:

- Low Carbon Ferro Chromium . . . for stainless and heat-resisting steels . . . available in standard grades of carbon content of 0.06% maximum to 2% maximum, all containing from 67 to 72% chromium.
- High Carbon Ferro Chromium . . . used in wrought constructional steels, cast steels and cast iron . . . containing 66 to 70% chromium and 4 to 6% carbon.
- Iron Foundry Ferro Chromium . . . developed especially for ladle additions to cast irons . . . with chromium content of 62 to 66%, carbon content from 4 to 6%, and silicon content 6 to 9%.

MAKERS OF VANCORAM FERRO ALLOYS AND METALS

Vancoram Brand Ferro Chromium is supplied in lump form, or crushed, or ground to various sizes. Our staff of experienced metallurgists is available for consultation to assist you in the use of ferro alloys.

VANADIUM CORPORATION OF AMERICA

420 LEXINGTON AVENUE, NEW YORK 17, N. Y. • DETROIT • CHICAGO • CLEVELAND • PITTSBURGH

"IF THAT TOP KICK COULD JUST SEE ME NOW!"

VETERANS! WHY NOT RUN YOUR OWN BUSINESS?

You can cash in on what you learned in the army about welding. Thousands of 200, 300 and 400 Ampere AC and DC Arc Welding units are surplus and available to you on veteran priority. There are large quantities of Hobarts and Lincolns, quite a few Westinghouse and fair amounts of other makes for sale now. Most of the equipment is used and in good operating condition. Best of all, it is being sold at prices you can afford in setting up your own repair shops or for contract work. Write, wire or phone the nearest War Assets Administration Regional Office below or come in and ask for the special veterans' service section.

FREE INFORMATION

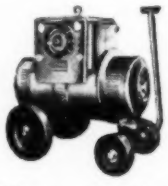
For full information clip and mail this coupon to War Assets Administration

Please send me complete information on the availability, condition and location of the following types of equipment:

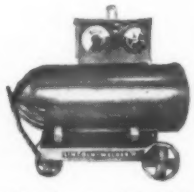
☐ Hobart Arc Welders
☐ Lincoln Arc Welders
☐ Westinghouse Arc Welders
☐ Electrodes and Welding Rods

Arc Welding Equipment: AC.... DC....
Electric Motor Driven: Volts.... Phase.... Cycles....
Transformer Type: Volts.... Phase.... Cycles....

Name.....
Firm.....
Address.....
City..... State.....



Hobart — Standard models of this make available in large quantities and most ratings.



Lincoln—In all models and most ratings. Hundreds in the popular 300-400 Ampere size.

EXPORTERS: Most surplus property is available to the export market. Merchandise in short supply is withheld from export, and if such items appear in this advertisement they will be so identified by an asterisk.

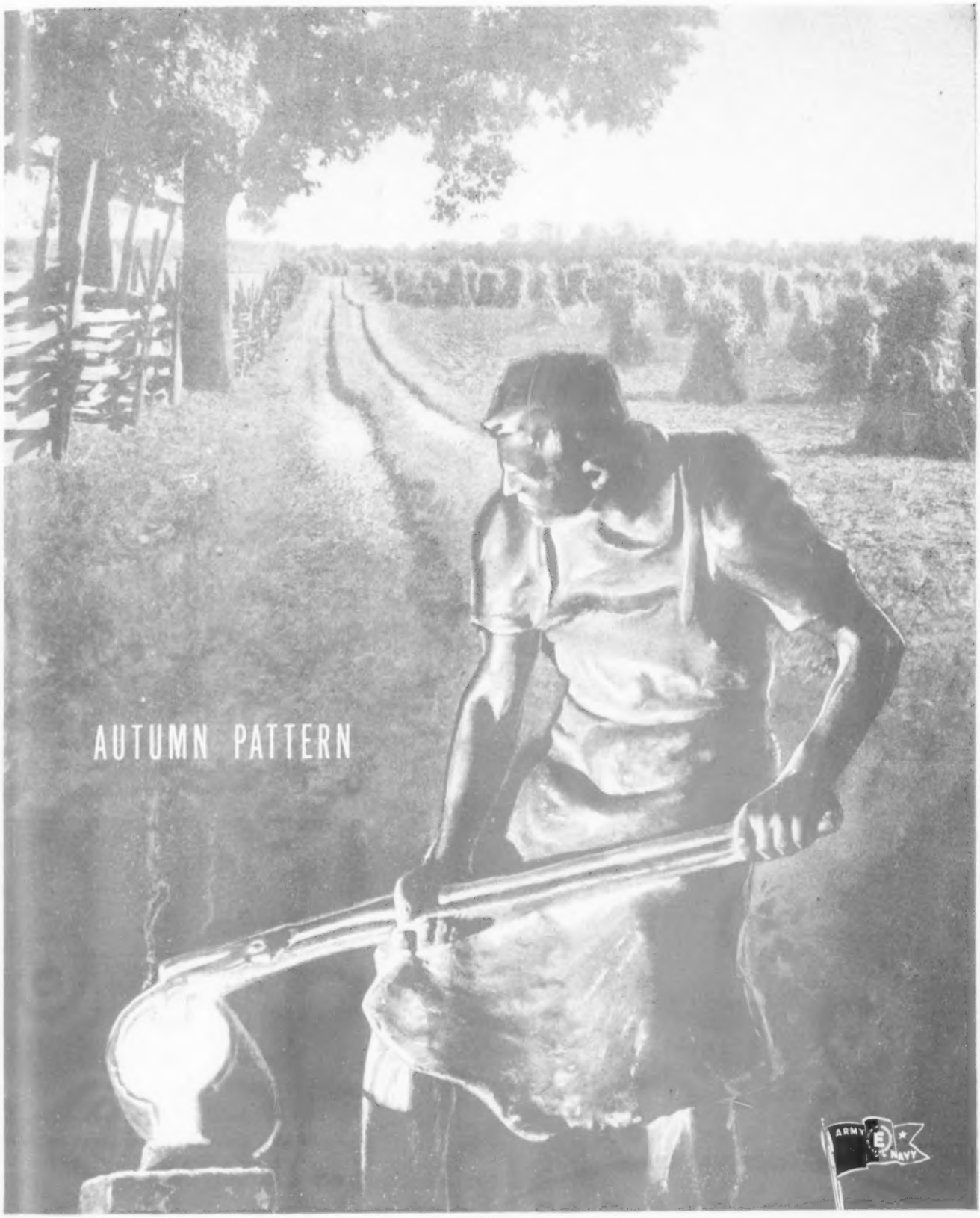
All arc welders are subject to priority regulations. VETERANS OF WORLD WAR II are invited to be certified at the War Assets Administration Certifying Office serving their area, and then to purchase the material offered herein.

WAR ASSETS ADMINISTRATION

GOVERNMENT OWNED SURPLUS

Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Fort Worth • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • New York • Oklahoma City • Omaha • Philadelphia • Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane

6492



WOOD AND METAL PATTERNS • KELLER AND DUPLICATOR WORK • MACHINE WORK • MALLORY METALS • BERYLLIUM COPPER • MONEL METAL

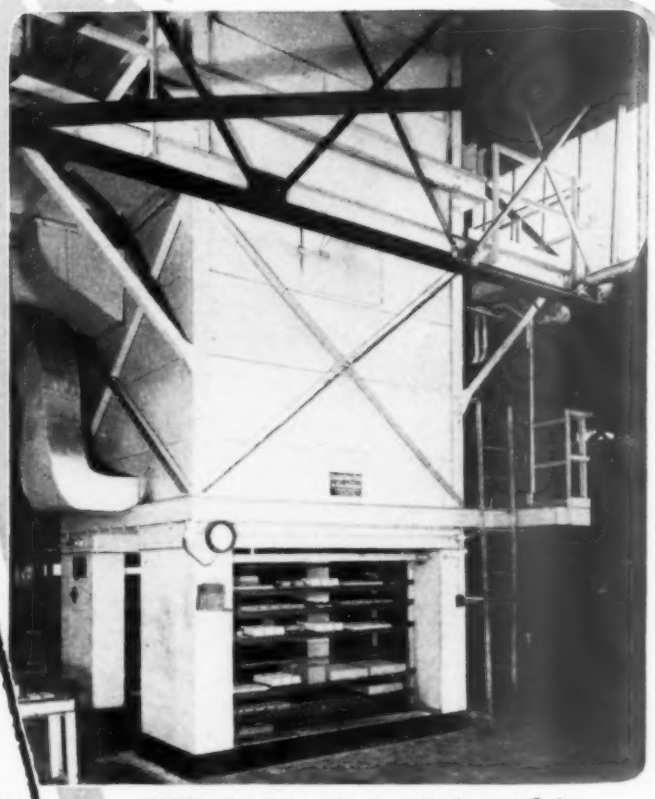
CITY PATTERN FOUNDRY AND MACHINE CO.
1161 Harper Ave. at Rivard St. • Detroit II, Mich.

EVERDUR CASTINGS • COPPER CASTINGS OF HIGHEST ELECTRICAL CONDUCTIVITY PERMANENT MOLDS BRASS, BRONZE AND ALUMINUM CASTINGS

COLEMAN TOWER OVEN

MALLEABLE IRON. One of several Coleman Tower Ovens in leading malleable iron foundry.

GRAY IRON. Core makers grouped around Coleman Tower Oven in gray iron jobbing foundry.



STEEL. Steel foundry installation of Coleman Tower Oven designed for second floor loading and first floor unloading.

BRASS. Coleman Tower Oven in plumber's brass goods and specialty foundry.

COLEMAN CORE *and* MOLD OVENS

The **FOUNDRY** CLEVELAND 13

BUILDERS OF COLEMAN

Pay for Themselves in One Year's Operation

Many users have reported direct savings in overall core department operations sufficient to pay for the entire cost of a Coleman Tower Core Oven installation in less than one year's time. Can *you* afford to pass up the opportunity for savings like these?

Some of the features that enable Coleman Tower Ovens to produce such amazing results:

PERFECT BAKING AT AMAZING SPEED. Perfect core baking eliminates rejects and make-overs.

PATENTED CENTER PASSAGEWAY. Permits loading from both inside and outside the Tower. Increases *loading accessibility* by as much as 300% compared with other vertical oven designs.

Close-up of Center Passageway

LARGE LABOR SAVING. The efficient grouping of coremakers and loading and unloading arrangement made possible by the Patented Center Passageway greatly increases production efficiency, also reduces indirect labor to a mere fraction.

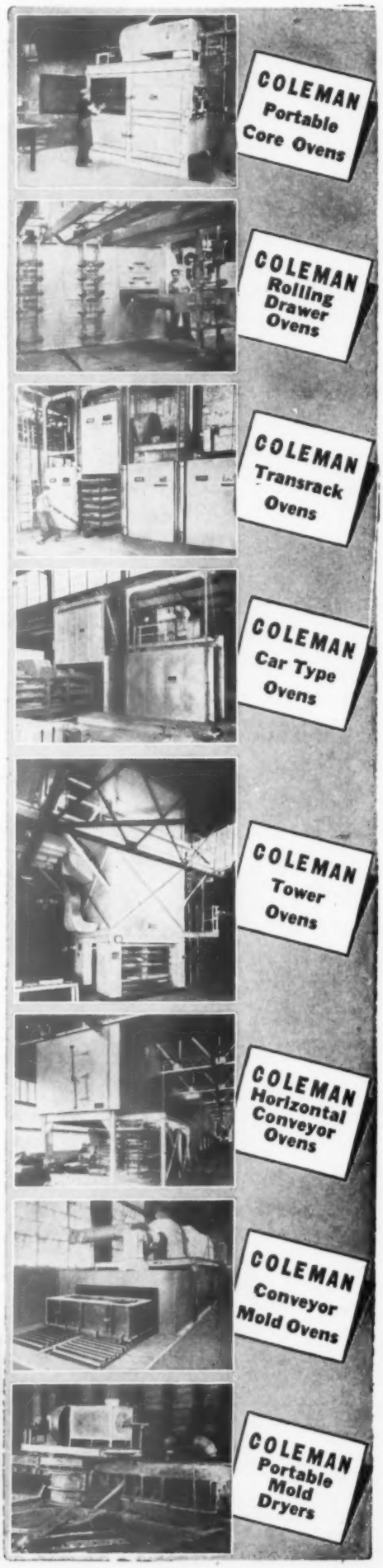
RECUPERATIVE COOLING. Cores are cooled before reaching the unloading position and the recovered heat is used over again, resulting in *big fuel saving*.

BETTER WORKING CONDITIONS. With the cores cooled and "smoked-off" before unloading there are no acrid fumes or gases nor uncomfortable heat in the core department. Better conditions increase output.

LARGE OUTPUT FROM SMALL FLOOR SPACE. In Coleman Tower Ovens all the baking is done overhead, giving you large core-baking capacity from practically the same floor space required by a single batch type oven.

OTHER ADVANTAGES. *These and many other features have been responsible for the wonderful record of performance of Coleman Tower Core Ovens in outstanding foundries producing gray iron, malleable, steel, brass, aluminum and magnesium castings. Coleman Oven Engineers not only pioneered the development of vertical conveyor type core ovens but have gained invaluable know-how in the successful application of this equipment in order to obtain the maximum results for the user.*

Write for Bulletins on complete line of Coleman Core and Mold Ovens.



EQUIPMENT Company

OHIO, U. S. A.

MEMBER

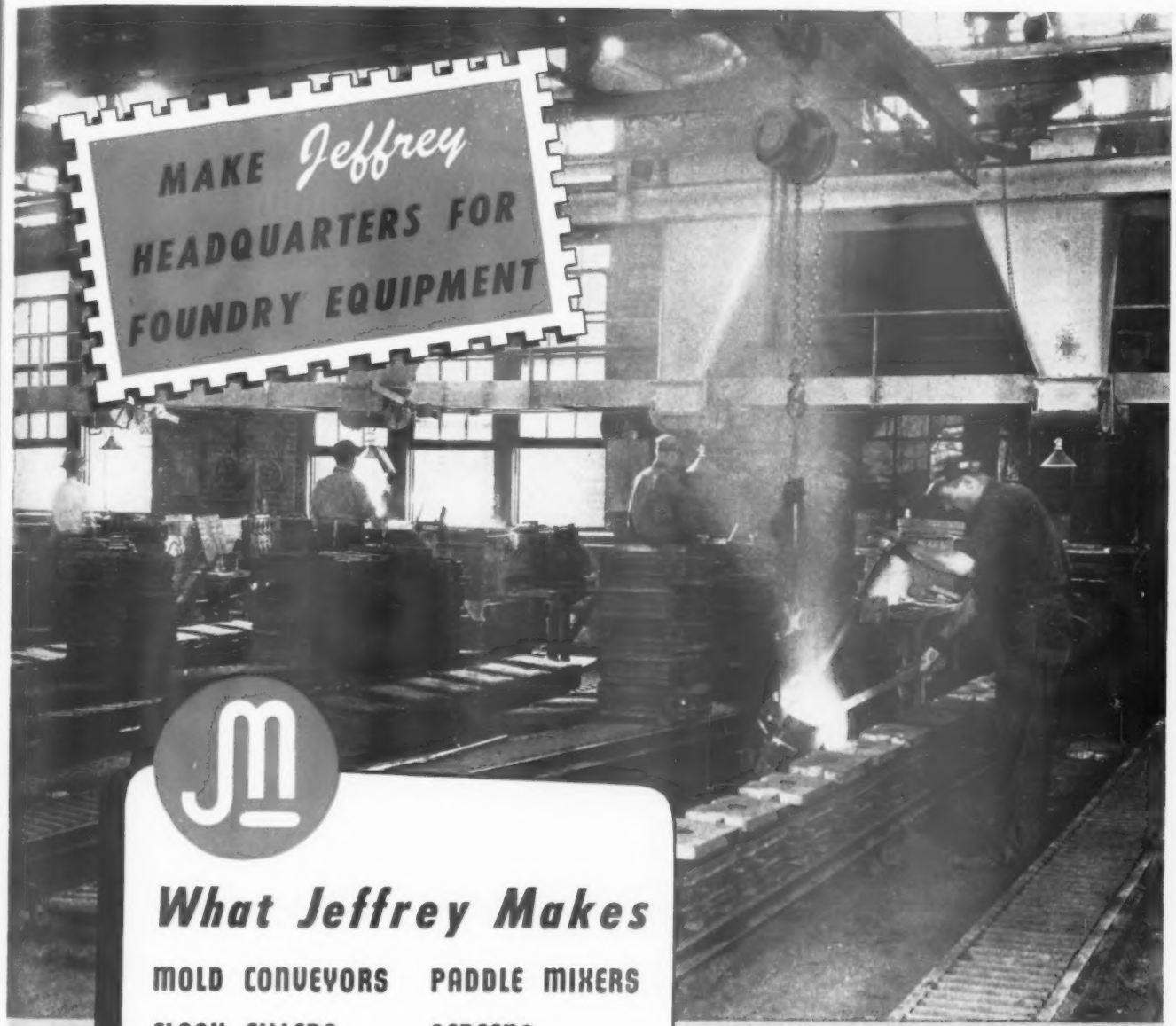
AND SWARTWOUT OVENS

Some day . . . perhaps . . . someone will discover how to produce even finer alloys. When such improvements come, you may be sure that our laboratory and research staff will promptly embody the advancements in SIPI Alloys. But today . . . regardless of how rigid or exacting your requirements may be . . . you may specify SIPI Alloys with absolute confidence, knowing that no finer quality is available.

Silverstein and Pinsof
INCORPORATED

1720 ELSTON AVENUE CHICAGO 22, ILLINOIS

BRASS • BRONZE • ALUMINUM • LEAD • TIN • SOLDER • TYPE METALS • BABBITT • ZINC BASE ALLOYS



What Jeffrey Makes

MOLD CONVEYORS
PADDLE MIXERS
FLASK FILLERS
SCREENS
AERATORS
BIN VALVES
SANDITIONERS
CONVEYORS
BUCKET ELEVATORS

A Modern Brass Foundry Molding Unit

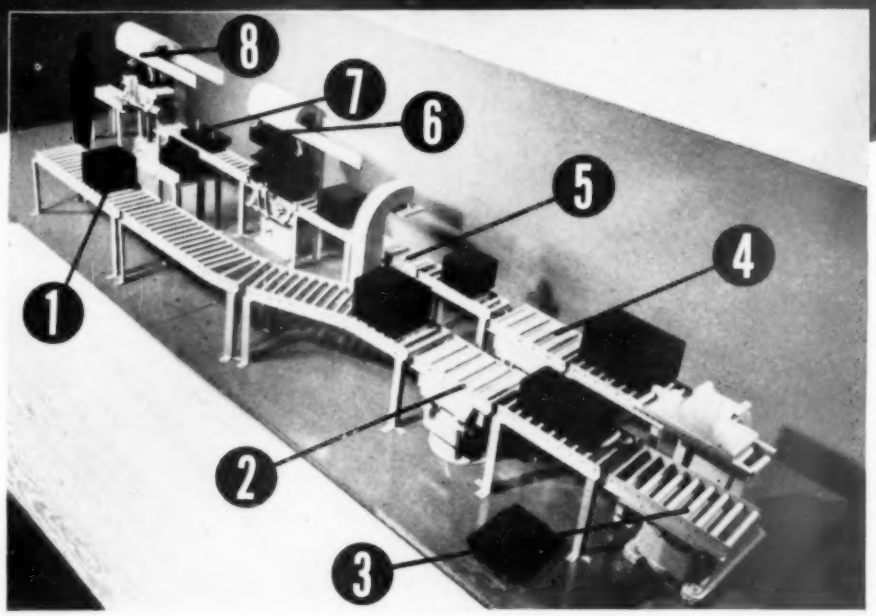
THE JEFFREY MANUFACTURING COMPANY

907-39 North Fourth St., Columbus 16, Ohio

Baltimore 1 Buffalo 2 Cleveland 13 Marion Milwaukee 11 Pittsburgh 22
Birmingham 3 Chicago 1 Denver 2 Houston 5 New York 7 St. Louis 3
Boston 16 Cincinnati 2 Detroit 13 Huntington 19 Philadelphia 3 Salt Lake City 1 Scranton 3

ESTABLISHED 1877

Why the FELLOWS MOLDING UNIT will give you more than 360 Snap Molds per hour . . .



Fellows Molding Unit, See description below.

This Progressive Match Plate Unit is Possible only Because of Special Machines which permit easy handling of a wide range of flask sizes in the same period of time. Each machine is designed to perform one operation only and arranged so the sequence of operations is the same as with conventional jolt squeezers.

HERE'S HOW IT WORKS

SEE DIAGRAM ABOVE

❶ Assemble pattern and flask on roller conveyor. ❷ Make drag half of mold on jolt machine with a roller conveyor depressed into table. Roller conveyor is actuated by four pistons bringing it into register with unit conveyor for rolling molds on and off. It is then depressed below surface of table and mold rests solidly for jolting. ❸ Place bottom board on mold and push into rollover machine for clamping and rolling over. Rollover machine is equipped with two roller conveyors, one fixed, the other mounted on a piston rod for clamping. Movable conveyor registers with conveyor from drag machine, fixed conveyor registers with conveyor to the cope machine when rolled over. ❹ Cope is made same as drag. ❺ Place squeeze board on mold, squeeze in plain squeeze machine with fixed platten. Roller conveyor depresses in table when squeezing. ❻ Mold is brought into machine until stops on drag flask register with stops on centering mechanism. An overhead cope carrier, which has previously been set to this mold, is brought into position against a stop to register with mold. Table is now elevated until pattern plate contacts four parallel projections of the carrier forcing it against machined surfaces in the head of the machine, so the pattern plate is squared up with the travel of the table. A levelling mechanism in table is now locked to insure an accurate pattern draw. As the table recedes, the cope hangs in carrier, operator holds pattern plate permitting the drag to draw away from it. Pattern plate is set in a rack adjacent to No. 1 position. Operator attaches carrier to overhead conveyor which delivers it to closing machine. Drag is advanced to core setting position number ❼ ❽ Mold and carrier are centered in closing machine same as draw machine. After mold is closed flask is stripped and set on conveyor at No. 1 position. Cope carriers are automatically disconnected from a continuous moving conveyor as they come into position at the draw and close machines. The operator attaches them again when the operation is finished. This conveyor is the mechanical pace setter for the unit.

• • •

HOW TO APPLY THIS UNIT TO YOUR FOUNDRY . . .

Arrangement of this unit is affected by physical dimensions of different foundries. We will gladly make preliminary sketches and recommendations for a unit best suited to your present foundry, and will work with your engineering consultant or material handling engineer to obtain a complete system. In the meantime, write for free bulletin No. F-1146.

SIMPLE MOLDING UNITS F COMPACT EFFICIENT

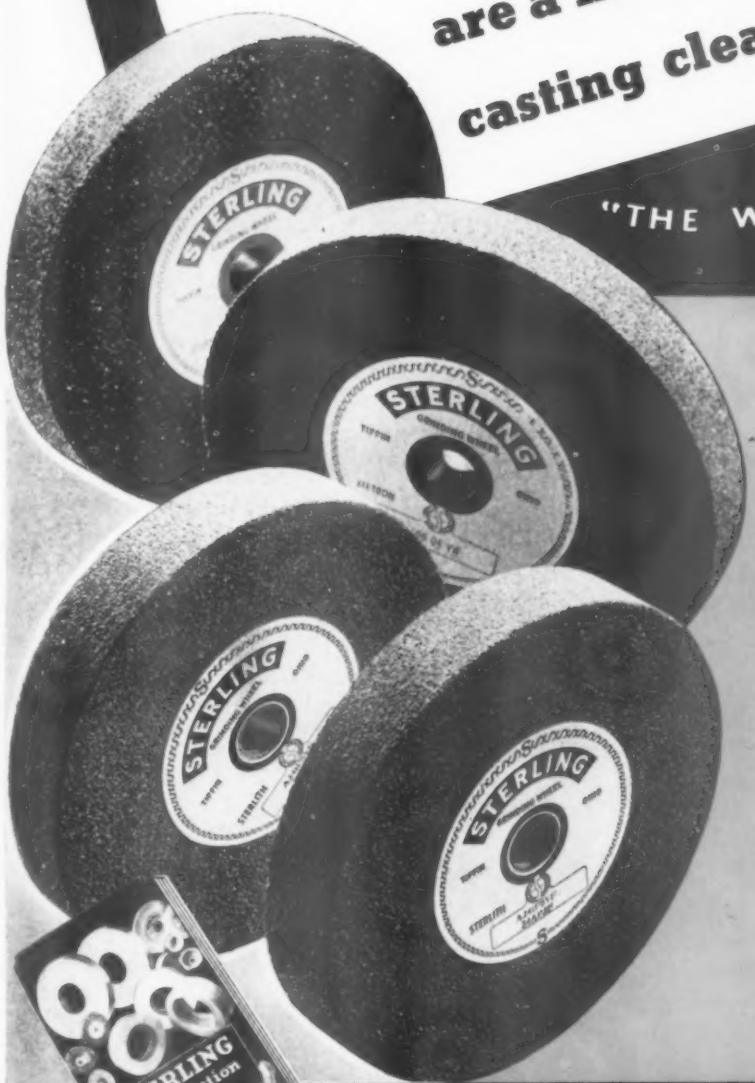
THE FELLOWS CORPORATION

1012 NORTH THIRD STREET • MILWAUKEE, WISCONSIN

Sterling

STANDARD SPEED SNAGGING WHEELS are a most profitable casting cleaning aid

"THE WHEELS OF INDUSTRY"



Send today for the Sterling Specification Selector . . . picks the wheel you need . . . makes selection easy.

Many foundries still prefer standard speed snagging wheels for swing frame or floor stands, rather than high speed operation. For this group, extremely tough Sterling Vitrified Snagging Wheels have been developed for cool operation and fast metal removal.

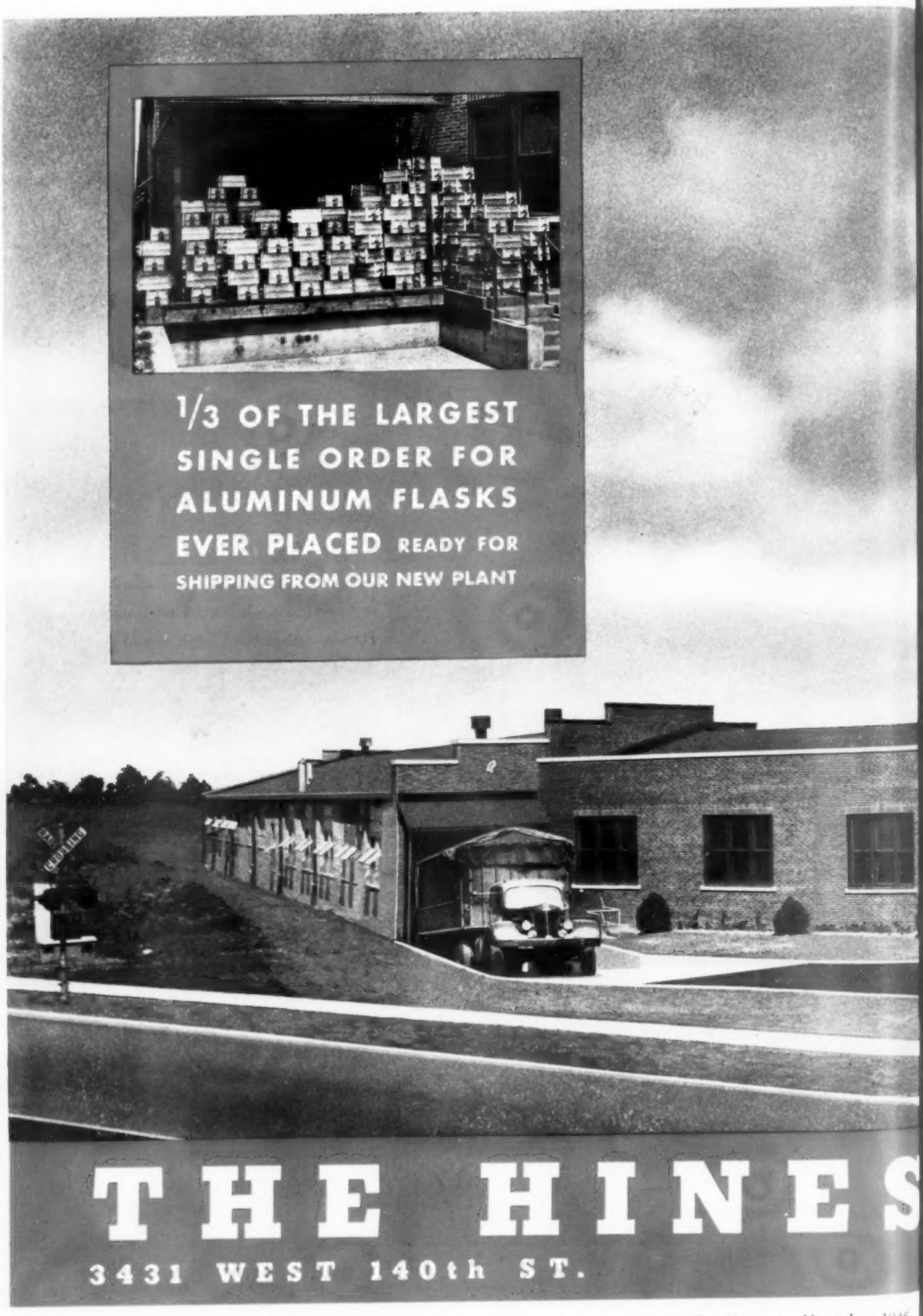
Backed by constant laboratory analysis and years of engineering experience, Sterling's "Wheels of Industry" are the logical choice where cleaning room operations must be quick and profitable.

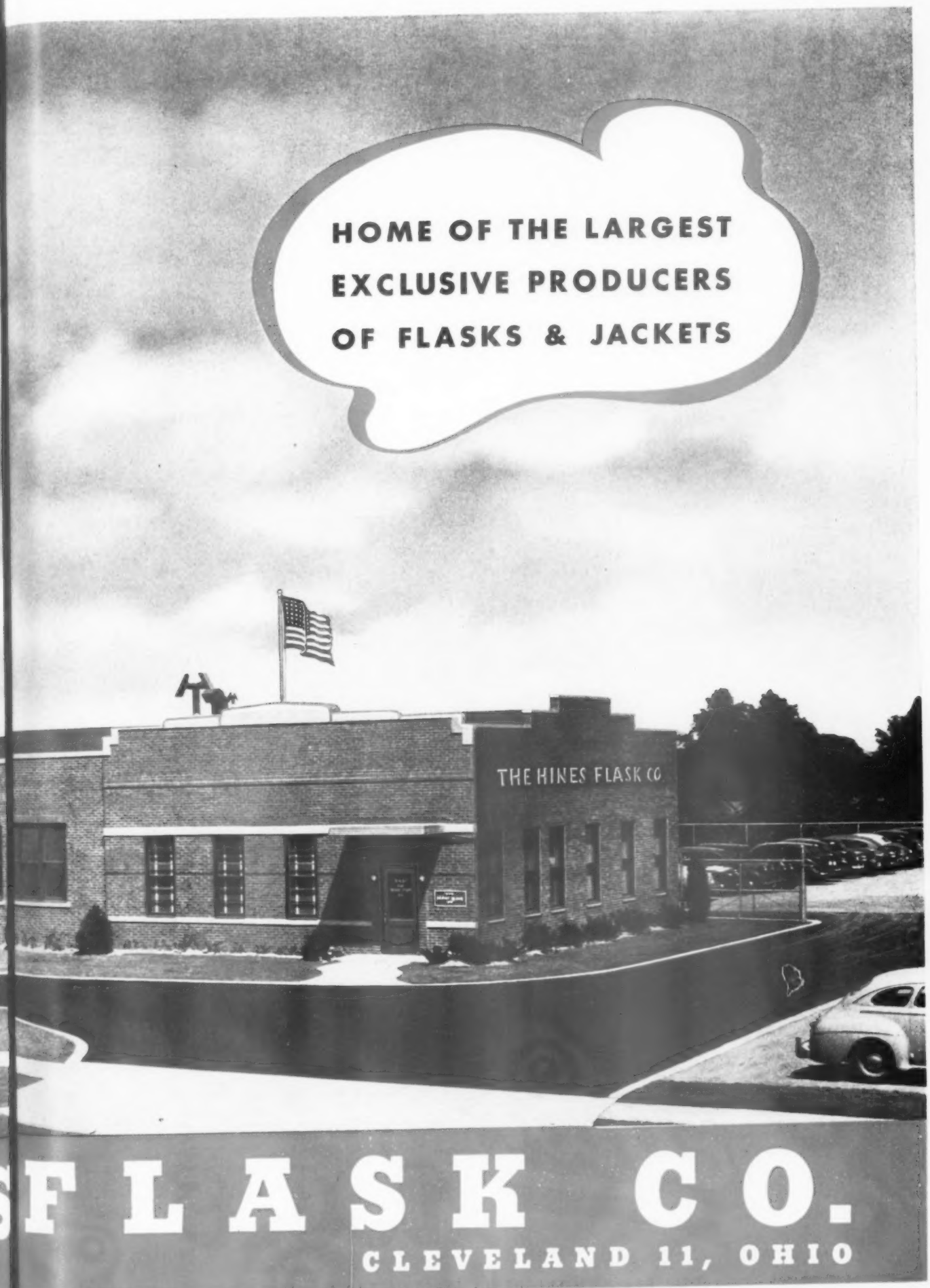
Sterling's engineers, skilled by long association with all kinds of foundry grinding problems, are ready to solve yours. Feel free to ask for this service.

• STERLING ABRASIVES •

THE STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

THE WHEELS OF INDUSTRY


1/3 OF THE LARGEST
SINGLE ORDER FOR
ALUMINUM FLASKS
EVER PLACED READY FOR
SHIPPING FROM OUR NEW PLANT
THE HINES
3431 WEST 140th ST.


HOME OF THE LARGEST
EXCLUSIVE PRODUCERS
OF FLASKS & JACKETS
THE HINES FLASK CO
S FLASK CO.
CLEVELAND 11, OHIO

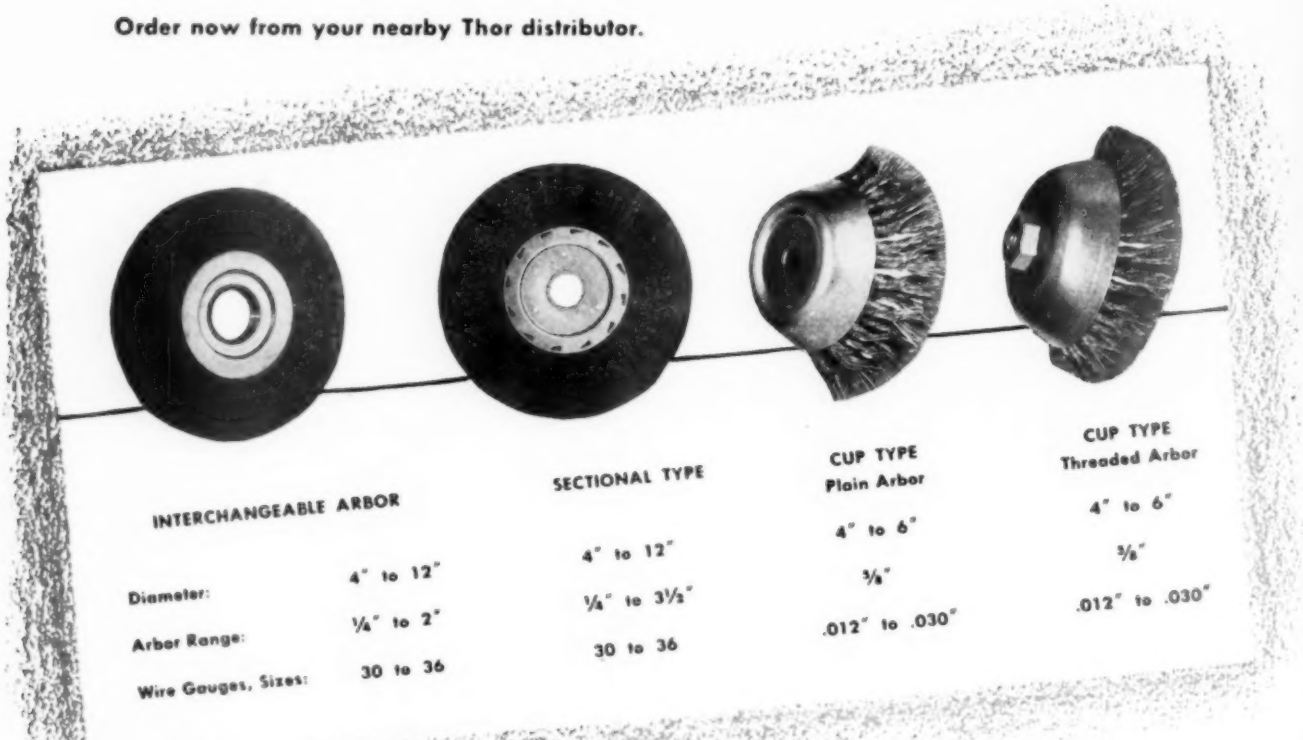
NOW... *Immediate Delivery!*

Thor WIRE WHEEL BRUSHES

from Distributors Stocks . . .

Now you can get immediate delivery of sturdy, long-life Thor wire-wheel brushes in most popular styles and sizes from your nearby Thor Distributor's stock. Available in a range of sizes from 4" to 12" diameter in single-unit, arbor-hole adaptor or metal-center sectional type. Brush sections are heavily filled with Double-Durable special crimp wire in gauges of 30 to 36. Constructed to resist crystallization and breakage, these modern brushes will operate efficiently on portable and stationary equipment with spindle speeds up to 6000 R.P.M.

Order now from your nearby Thor distributor.



	INTERCHANGEABLE ARBOR	SECTIONAL TYPE	CUP TYPE Plain Arbor	CUP TYPE Threaded Arbor
Diameter:	4" to 12"	4" to 12"	4" to 6"	4" to 6"
Arbor Range:	¼" to 2"	¼" to 3½"	⅝"	⅝"
Wire Gauges, Sizes:	30 to 36	30 to 36	.012" to .030"	.012" to .030"

INDEPENDENT PNEUMATIC TOOL COMPANY
600 W. Jackson Boulevard, Chicago 6, Illinois
BRANCHES IN PRINCIPAL CITIES

Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

Now You Can Eliminate DUST

. . . Effectively and Economically with the Hydro-Foam Collector

The Mahon Hydro-Foam Dust Collector does the job the logical, effective way—deposits all dust safely under water . . . there are no cloth screens, dust bags, jets, nozzles, or other device requiring cleaning, repair or frequent replacement. Even the most minute particles of dust are trapped and removed from the air by the Foam Bed. These collectors are produced in standard units of 3000 cfm capacity—multiple units are employed to handle any amount of air to cope with any dust condition. Have a Mahon engineer explain to you the advantages of this patented Hydro-Foam principle.

Address INDUSTRIAL EQUIPMENT DIVISION

THE R. C. MAHON COMPANY

Detroit 11, Michigan • Western Sales Division, Chicago 4, Illinois

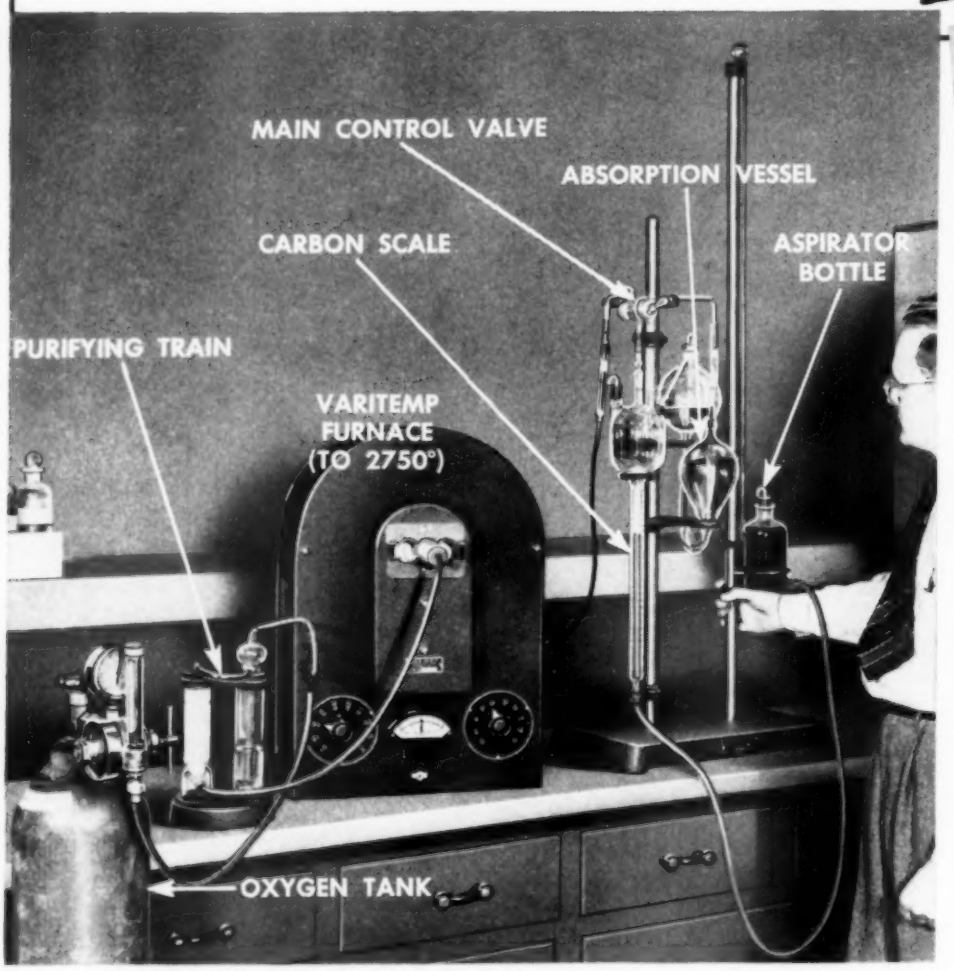
Engineers and Manufacturers of Dust Collecting Systems, Complete Finishing Systems, Annealing Ovens, Core Ovens, and many other Units of Special Production Equipment.

REMOVES THE DUST FROM INDUSTRY

The battery of Mahon Hydro-Foam Dust Collectors illustrated above is one of two batteries serving a buffing and polishing department in one of the great mid-west automobile plants. The patented Hydro-Foam Collector may be manifolded together in batteries of two, three or four to a common sludge tank, and any number of batteries may be employed to meet capacity requirements.

MAHON

DETERMINE CARBON IN *2 MINUTES*



for both IRON and STEEL

With the sample weighed and loaded the test cycle involves only:

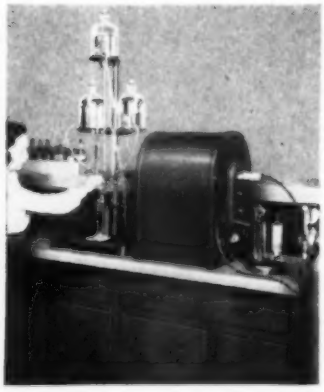
Start and stop oxygen supply.

4 Settings of Main Control Valve.

8 Short Motions of Aspirator Bottle.

Then you read graduated Carbon Scale, correct for temperature and barometric pressure and you have carbon to ⅕ of ONE POINT.

SIMPLE — STRAIGHTFORWARD — ACCURATE AND *NOT EXPENSIVE*



⬅ SULPHUR DETERMINATOR

For accurate analyses of metals, coal, coke, etc.

Testing cycle — 2 minutes.

Accuracy to ⅕ of One Percent.

Applicable to either Iodate or Alkaline methods.

MOISTURE TELLER ➡

Determines amount of moisture in a test sample usually within 1 minute and without the use of charts or log tables. Entirely self-contained and sturdily built. Needs no technical operator.

HARRY W. DIETERT CO.

9324 ROSELAWN AVE. • DETROIT 4, MICHIGAN

Houghton is fortunate, in these days of shortage, to be able to announce that we can supply quality core binders. There are two reasons:

First, our Hy-Ten Core Oils do not depend to any sizable extent on vegetable drying oils, now so scarce. They are largely based on mineral polymers and thermo-setting materials which are still available in a time when old-fashioned oxidizable oils are mighty hard to get.

The second reason for our ability to provide good core binders in volume lies in our line of Hy-Ten *Dry* Core Binders, based on thermo-setting resins. Dry binders are increasingly popular, even with firms who may still be able to obtain oil-type materials.

So when you need immediate supplies of core binders, which have not been lowered in quality despite current shortages, call on E. F. HOUGHTON & CO., 303 West Lehigh Avenue, Philadelphia 33, Pa.

HOUGHTON'S

HY-TEN CORE BINDERS

NEW A-O MITTENS

for heavy die casting operations

The 6X168 Cover-Mitt is made from selected asbestos; has a quilted palm, and is lined to provide insulation and added protection. Thumb seam is reinforced with flame-resisting strap.

The 6X169 Under-Mitt is made from chrome tanned split horsehide leather, specially tanned to resist heat; is extremely soft and flexible to allow freedom of movement. Seams are steel sewed.

These new A-O Die Casting Mittens are reversible (may be worn on either hand) insuring almost double life; are most effective when used in combination, but may be ordered separately if desired. Your nearest A-O Safety Representative can supply you.

American Optical COMPANY *Safety Division*

SOUTHBRIDGE, MASSACHUSETTS
BRANCHES IN PRINCIPAL CITIES

JACKETS

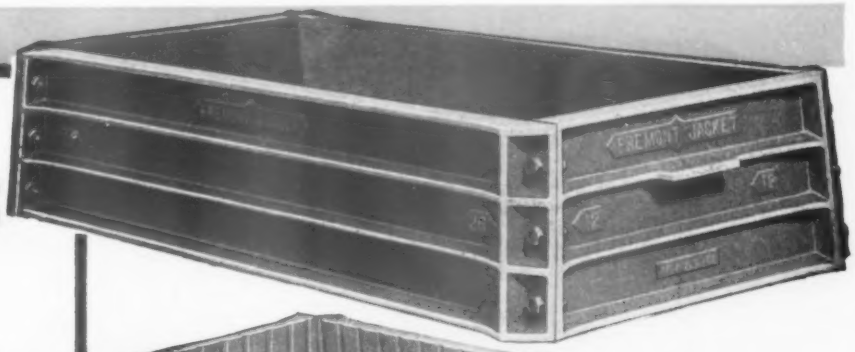
FURNISHED

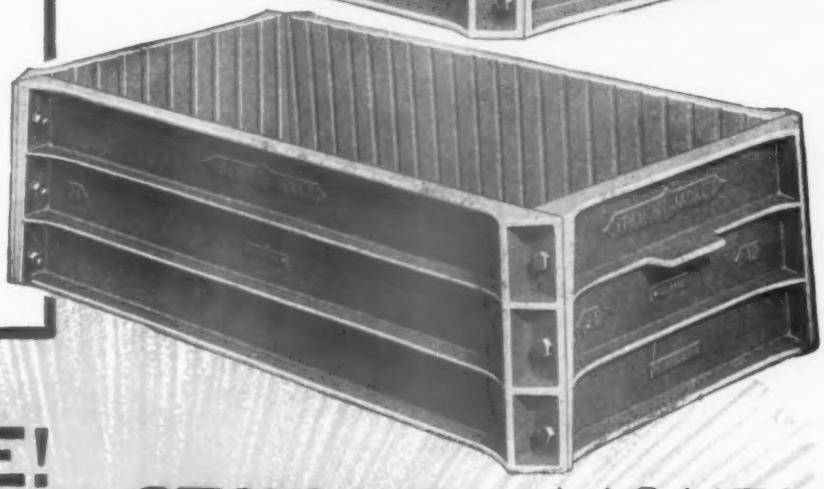
IN

CAST IRON

OR

ALUMINUM





ACCURATE!

STURDY!

LIGHT!

BUILT FOR LONG SERVICE AND FAST PRODUCTION

GROOVLOCK

THE FOOL-PROOF PIN

FREMONT MAGNESIUM FLASKS

THE FREMONT FLASK CO.

Fremont, Ohio

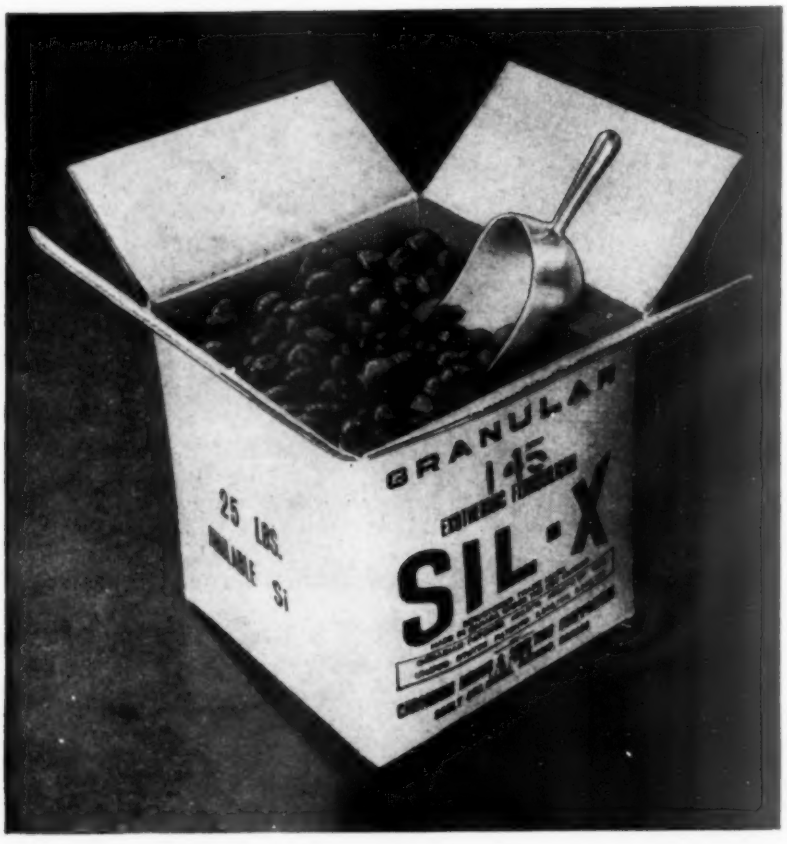
SIL·X

REGISTERED TRADEMARK
(REG. U.S. PAT. OFF.)

EXOTHERMIC FERROSILICON

First introduced
in BRIQUETS

NOW ALSO AVAILABLE IN
GRANULAR FORM



In the STEEL PLANT

use:

No. 75 "Sil-X", Granular

(1) For Silicon additions.

(2) In the electric furnace for fast recovery of chrome from oxidizing slags.

(3) To block killed steel heats economically in record time.

No. 217 "Sil-X", Granular in the Open Hearth

(1) To shape up the slag, and reduce furnacing time.

(2) To prevent phosphorus reversal.

(3) To save fluorspar and iron ore in producing a fluid basic slag.

(4) For rimming and non-age-hardening steel.

No. 217 "Sil-X" is also used in "cold" heats to increase fluidity with a slight beneficial increase in temperature eliminating excessive ladle sculls.

In the IRON FOUNDRY

use:

No. 145 "Sil-X", Granular

For Chemistry in the ladle, and greater recoveries of Si, permitting the use of a low silicon pig iron and increased quantities of steel scrap in the charge. Any amount can be added without decreasing the temperature of the metal in the ladle.

No. 217 "Sil-X", Granular

For fluidity when the temperature of the metal out of the cupola is low, particularly on the first tap, enabling the pouring of thin sections without pre-heating or washing of ladles.

use:

Both 145 "Sil-X" and 217 "Sil-X" to degasify and deoxidize the metal in the ladle, eliminating porosity from these causes. They will improve machinability and grain structure.

Write for our pamphlet: "A Word About Exothermic Ferroalloys in the Foundry".

If you have a slag conditioning problem, or are interested in learning more about the advantages of "Sil-X" either in the steel plant or the foundry, an experienced service staff is at your disposal.

Sales Agents:

In the United States: **Exothermic Alloys Sales & Service, Inc.,**
710 Ohio Merchants Trust Building, Massillon, Ohio.

In Western Canada: **Overseas Commodities Limited,**
Pender Street, Vancouver, B.C.

CHROMIUM
MINING & SMELTING CORPORATION
LIMITED
SAULT STE. MARIE ··· ONTARIO CANADA

BETTER PATTERN SHOP EQUIPMENT

MANY OUTSTANDING FEATURES

- 32" Throat Clearance
- 24" Vertical Adjustment of Table
- 8" Travel of Spindle
- 30" Longitudinal Travel of Table
- 16" Transverse Travel of Table
- 90° Tilting Spindle in Both Directions
- 30° Tilting Table in Both Directions
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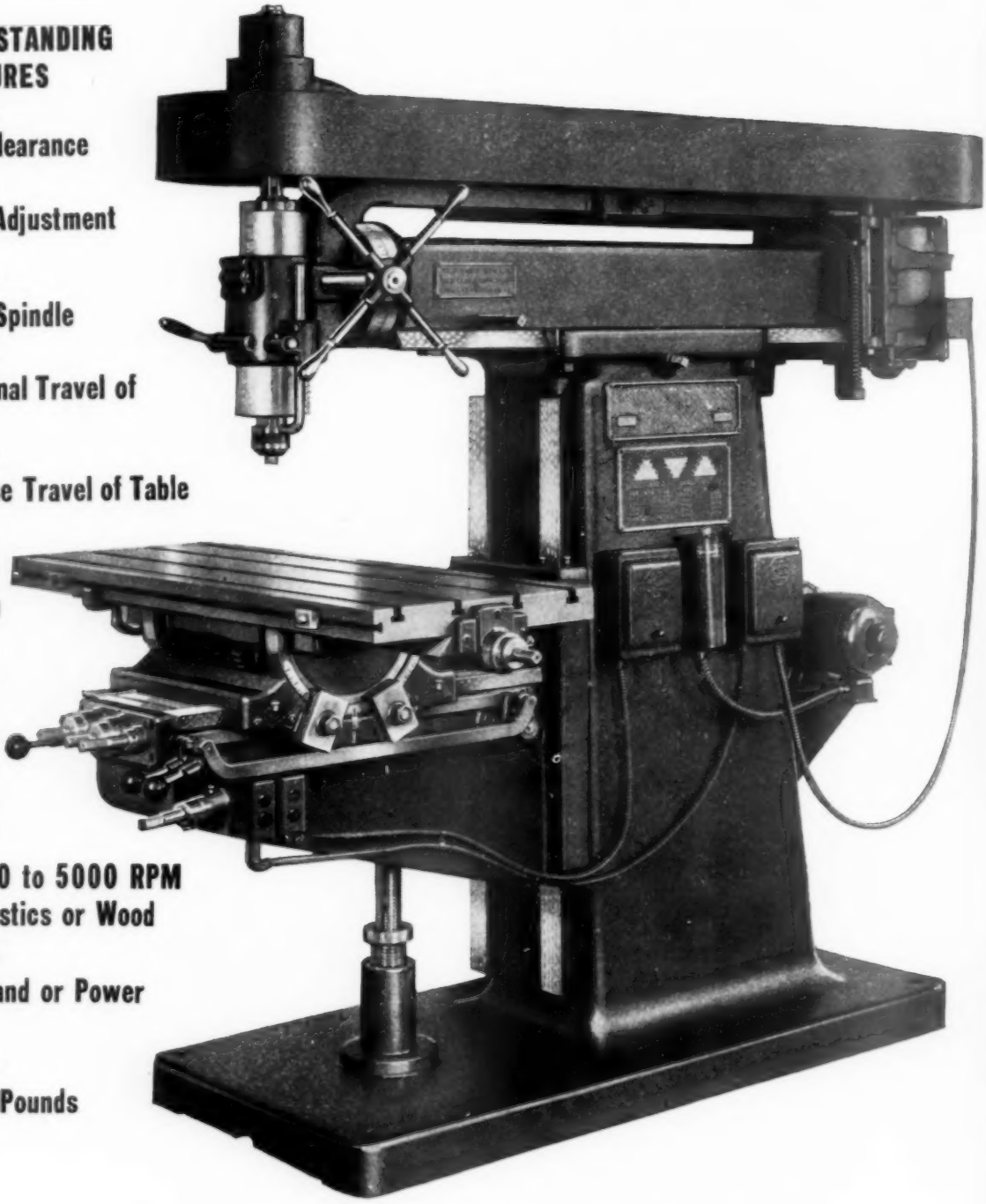

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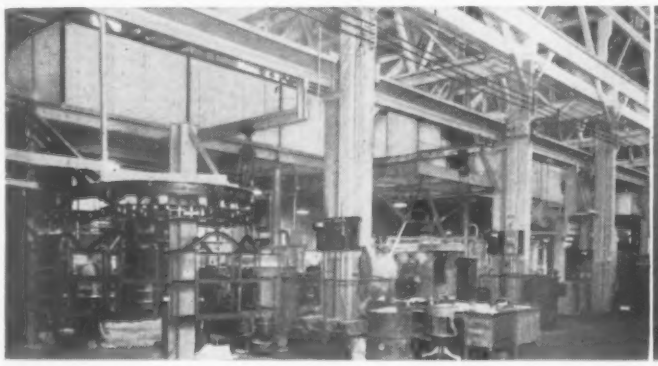

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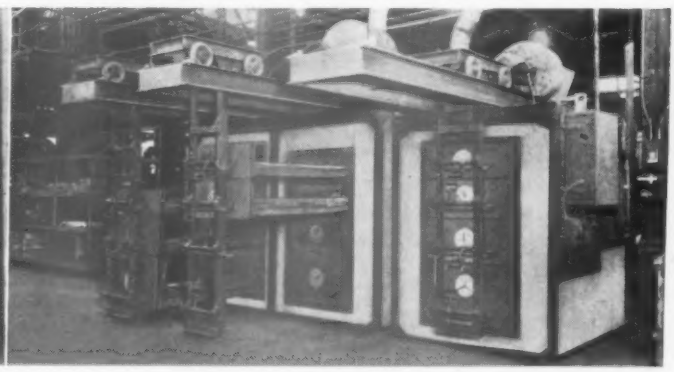

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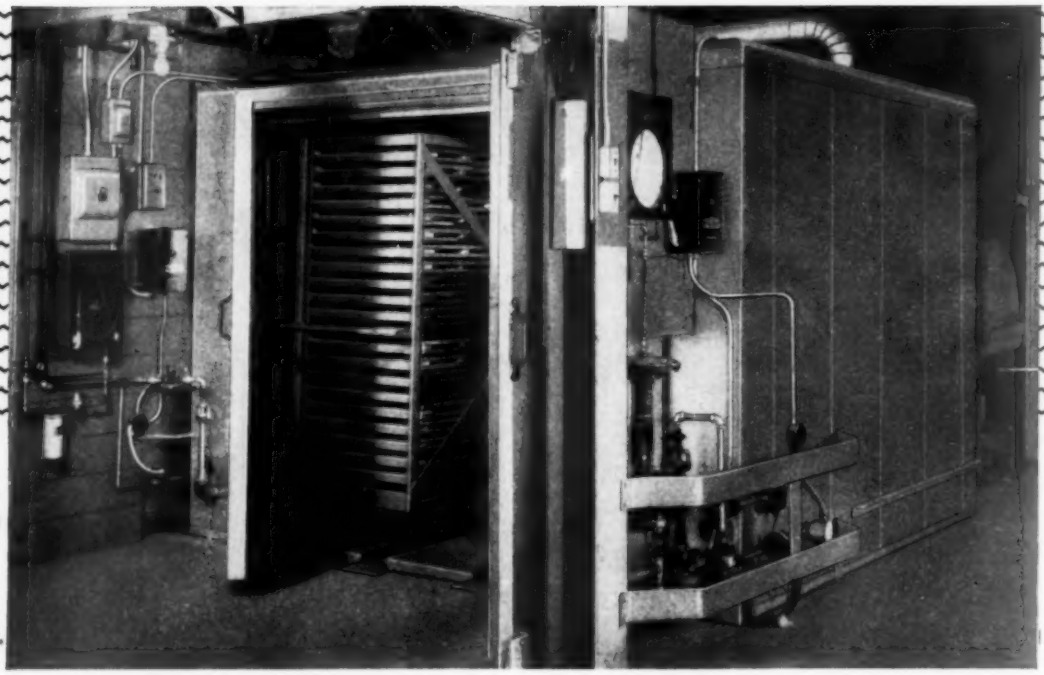

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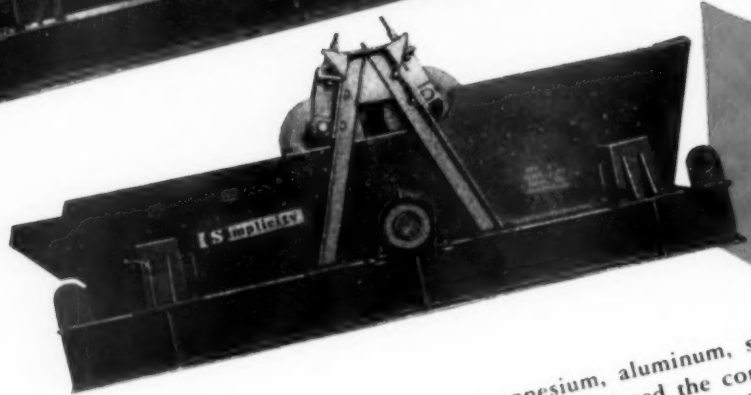

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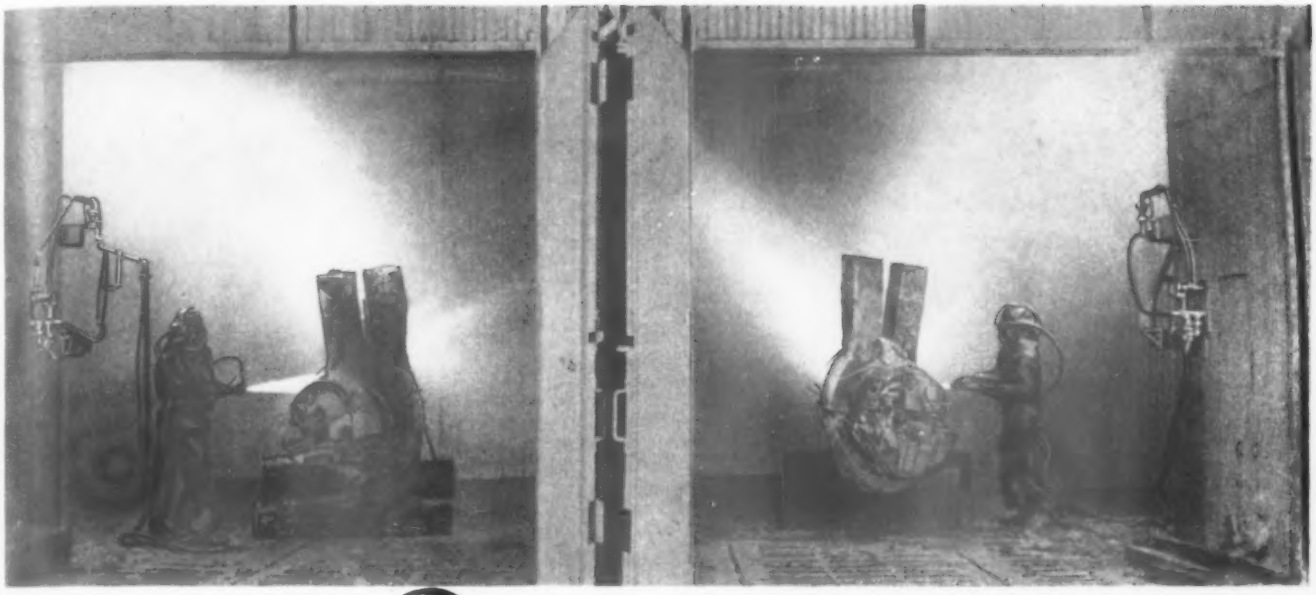

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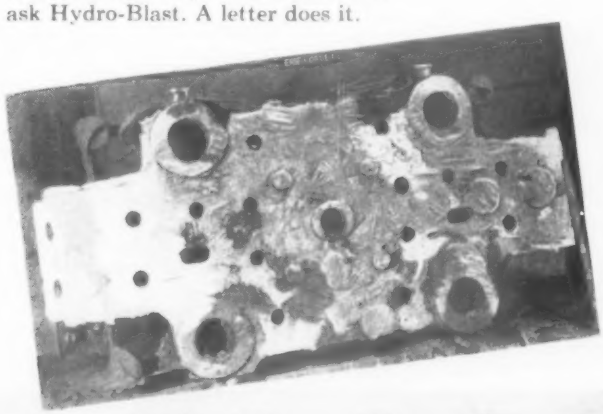

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It's Time To Remove War Controls from Foundries

GOVERNMENT controls continue to confuse the situation in gray iron and malleable iron fields. Continuation through the fourth quarter of the certification policy, which provides an almost unlimited supply of pig iron for foundries casting products to be used in veteran housing projects, has complicated greatly the problem of raw materials procurement of foundries not producing "certified" work. Foundrymen in all sections of the country are finding it most difficult to secure sufficient pig iron, scrap and coke to maintain operations on a five-day basis. Users of castings are familiar with the difficulties provoked by government action, and fear that failure to receive castings in volume will force curtailment of their own manufacturing operations. Overstressing castings for housing may cut jobs in other metalworking industries where castings are important materials of construction.

Effect of government allocation on normal production of malleable and gray iron castings was revealed in August, when the total of certified orders required better than 50 per cent of the total production of foundry iron. Complete acquiescence of the Civilian Production Administration to demands of the National Housing Agency, with the idea of making the demands of the latter ridiculous, only resulted in making both organizations appear foolish. While it is granted that the housing boom requires certain types of castings in quantities greater than normal, there has been no adequate proof that immediate demand is equal to present production. More than likely, estimated casting needs are based on the housing goal, which will fall far short of realization this year. According to news reports, nails and certain other building materials now are needed far more than castings. Although castings for housing have been produced in tremendous quantities, the output of castings for hundreds of other much needed products is being reduced almost in proportion to the amount of pig iron diverted from normal channels.

Government reports forecasting an increase in the amount of pig iron available to foundries as the result of establishing a premium payment plan for increasing pig iron production, now appear considerably over-optimistic. A study of the situation reveals the growing shortage of coke, and to a less extent a shortage of iron ore, which will prevent any sizable increase in the tonnage of pig iron available to foundries. Any advantage given iron foundries through the recent incentive price increase on prepared grades of cast iron scrap was quickly removed when purchase limitations of the plan were eliminated and open-hearth operators were permitted to buy these grades.

If the foundry industry is not to be hamstrung in its efforts to provide castings in a volume sufficient to meet today's industrial production needs, it is time to remove all government war emergency controls, including allocations and price controls.

Frank G. Steinebach
Editor

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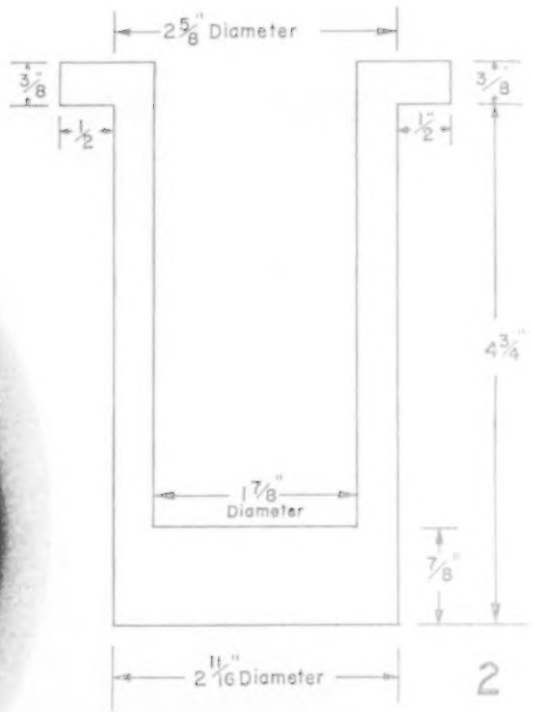


2

PRESSURE-TIGHT Phosphor

Success of the oxidation-reduction melting procedure in wartime production of pressure-tight phosphor bronze castings leads to the authors' belief that this method can be used advantageously to reduce porosity and improve physical properties of various copper-base alloy sand castings

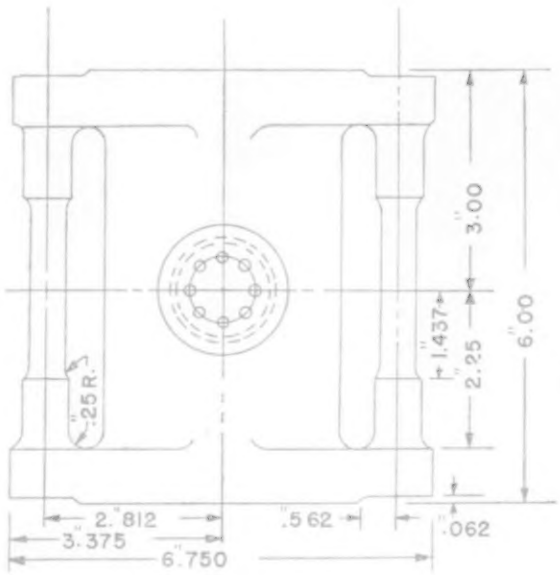
DURING one period of the war production program, procurement of suitably dense bronze castings for certain naval ordnance optical units became critical. These castings, which formed such parts as bodies, joints and covers for telescopes and periscopes, were required in the final assembly to hold inert gas under a slight pressure for indefinite periods in order to prevent the entry of moisture of the atmosphere into the unit. The machining operations, necessary in the finishing of the parts, removed the skin of the castings and exposed the relatively porous interior. The majority of commercial high-grade bronze castings obtainable did not meet the requirement for pressure tightness after machining.

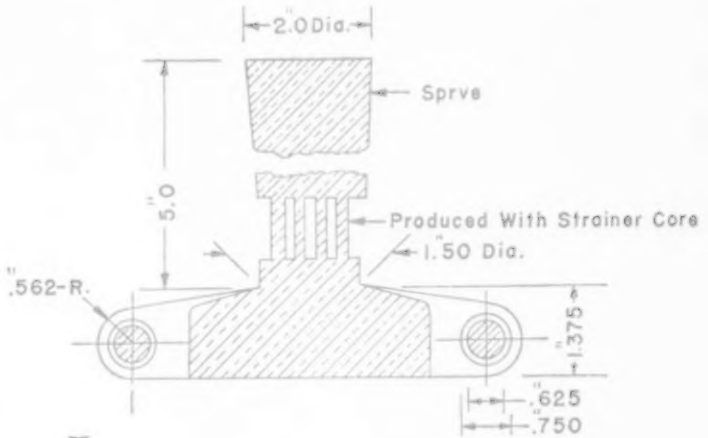
Many porous castings were salvaged by impregnation with phenolic resin impregnating compounds. Impregnation, however, was only partially successful in sealing the porosity and retarded production because of the additional processing time required. It was frequently necessary to re-impregnate castings as many as three or four times, and even then, a small percentage of "leakers" remained.

Since the porosity was in evidence throughout the castings and not localized, it was assumed that the molten metal conditions, and not the mold conditions, were the cause of porosity. Therefore, investigations were limited to the molten metal conditions.

The oxidation-reduction melting procedure, described herein, was finally adopted for producing pressure-tight phosphor bronze sand castings (88-9-3) (Navy Department Specification 46B5i, Grade I), under the melting conditions of the U. S. Naval Gun Factory. This method produces sound, dense castings, eliminates all impregnation operations, improves the physical properties of the metal and enabled the U. S. Naval Gun Factory to maintain the production schedule of the critical optical units.

The method was also successfully used for making pressure-tight ounce metal sand castings (85-5-5-5) (Navy





3

By COMDR. RICHARD H. LAMBERT
Bureau of Ships, Navy Department
and
VINCENT DePIERRE
Metallurgist, U.S. Naval Gun Factory
Washington

...r Bronze Castings

Fig. 1—Radiograph of bronze casting made by the oxidation and reduction method. This casting did not leak after machining and application of pressure

Fig. 2—Hi-Hat cast specimen used to test porosity

Fig. 3—Flask tension test bars

Fig. 4—Radiograph of bronze casting made by the general method which, after full machining, leaked on application of air pressure

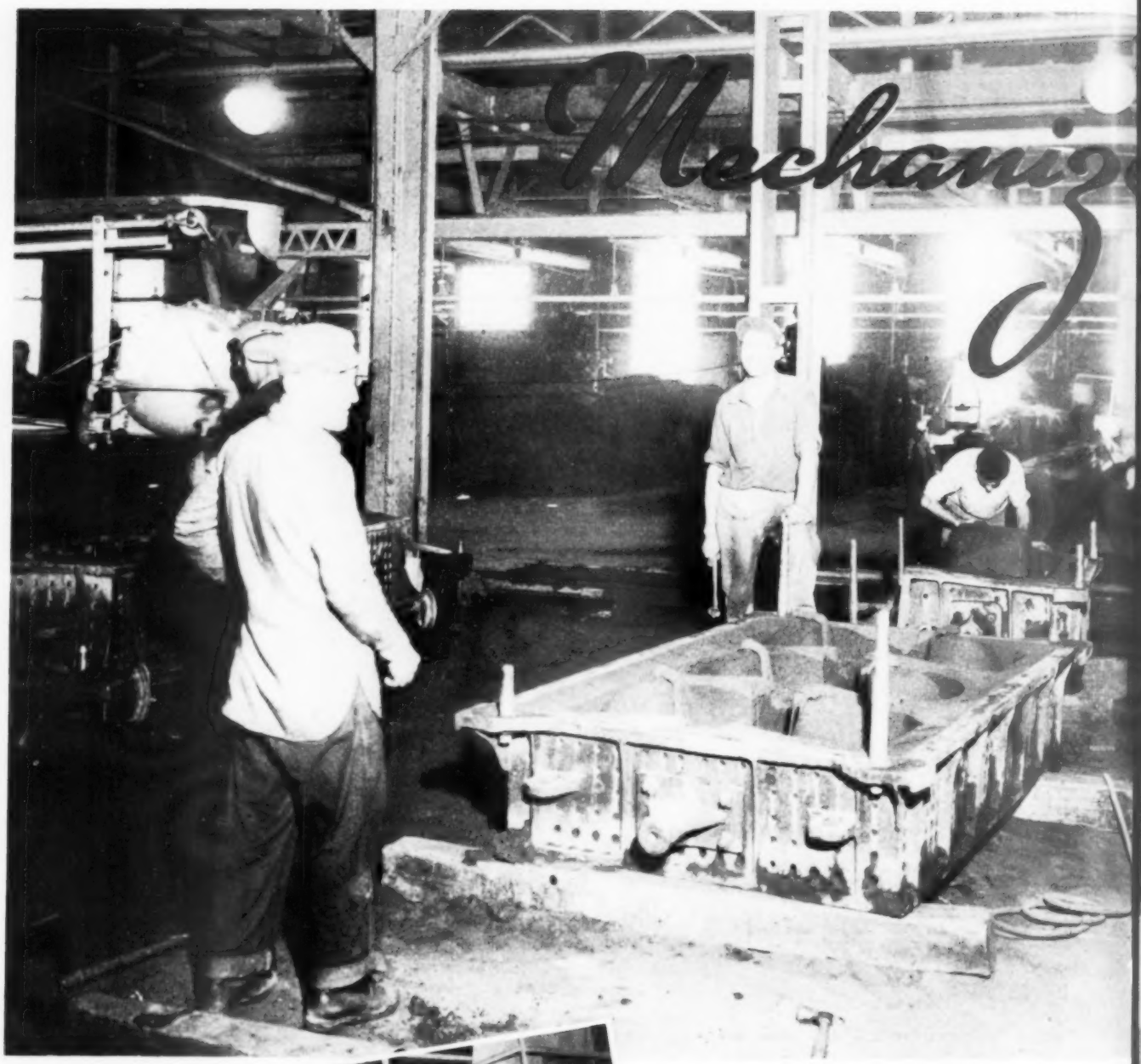
Department Specification 46B23d). It is believed that the oxidation-reduction method can be employed advantageously for reducing porosity and improving physical properties in sand castings of copper-tin, copper-tin-lead, copper-tin-zinc, and copper-tin-zinc-lead alloys with or without nickel additions. It is hoped that other foundries will benefit by the use of the process described in this article.

Metal for pouring bronze castings in the U. S. Naval Gun Factory is melted in a natural-draft, pit-type crucible furnace. The melting procedure used for bronze castings consisted of melting ingots with a charcoal cover and an oxidizing atmosphere or melting virgin metals under an oxidizing atmosphere as follows:

1. Melt copper, (Grade A, Navy Department Specification 46C5).
2. Add charcoal cover.
3. Add tin, (Navy Department Specification, 46T1d).
4. Add zinc (Grade A, Federal Specification, QQ-Z-351).
5. Add lead, (if required) (Grade A, Federal Specification, QQ-L-171).
6. Deoxidize with 1 oz 10 per cent phosphor copper per 100 lb melt before pouring.

The foregoing melting procedures are those generally used in the foundry industry and produce unsatisfactory bronze castings for optical parts requiring air pressure tests after machining. Chemical analyses showed porous castings to be within specification requirements and not having any incidental impurities such as silicon or aluminum which would tend to cause porosity in the castings.

Test analysis of the gases in (*Please turn to page* 131)



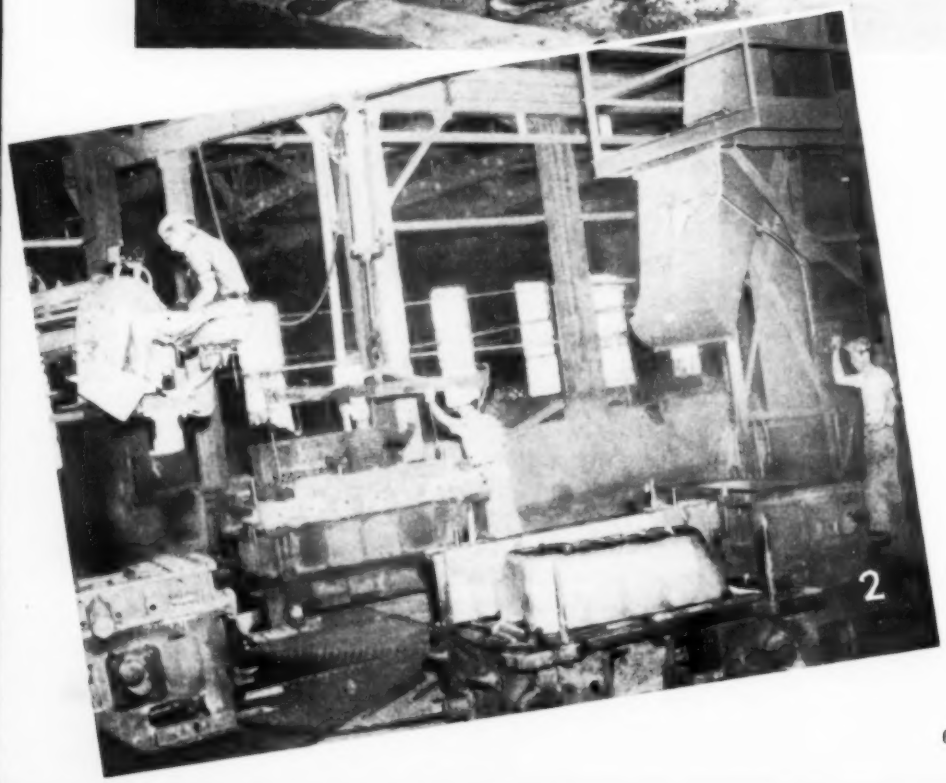


Fig. 1—Sinks are molded and poured six at a time in rigid cast iron flasks vented at sides and ends

Fig. 2—Cope and drag patterns move on a turntable at floor level. Preliminary sand falls from a chute. Remainder of flask is filled and rammed under a sandslinger

Fig. 3—Drag flask has extension along one side to accommodate the apron member of the bathtub casting

Bathtub Foundry

By PAT DWYER
Engineering Editor
THE FOUNDRY

A POTENTIALLY unlimted market for bathtubs and other sanitary ware castings to meet the demands of a nationwide building industry induced the Richmond Radiator Co., Uniontown, Pa., an affiliate of the Reynolds Metals Co., Richmond, Va., to take over and operate a plant at Monaca, Pa., originally built by the U. S. Sanitary Mfg. Co., Pittsburgh, but which had been standing idle for the past three years. Preliminary work started in November, 1945, but the chaotic and tangled conditions prevailing as a result of the war, delayed delivery of supplies and equipment to such an extent that fairly normal production was not achieved for several months. Production also was naturally delayed by the necessity of training a local crew.

A supervising crew of experts from the parent plant worked literally day and night installing and servicing methods and equipment and in training employees recruited locally. The majority were willing, adaptable and anxious to learn, but, as teachers of children and men can testify, the process is slow and irritating and decidedly down near the tail end of any list of preferred occupations for men with the faintest trace of nerves or the least tendency toward the development of stomach ulcers. However, according to a well known and frequently quoted foundry legend, seemingly impossible jobs can be brought to a successful conclusion by patience, perseverance and a light application of sweet oil. In this particular instance the daily heat was up to 80 tons by the first of July and was steadily advancing. The volume of scrap castings was reduced to a satisfactory percentage and the employees were showing greater speed and skill.

In the main group of buildings covering an area 240 x 1050 ft, the foundry at one end occupies space 128 x 400 ft. A paved driveway separates other buildings into two main

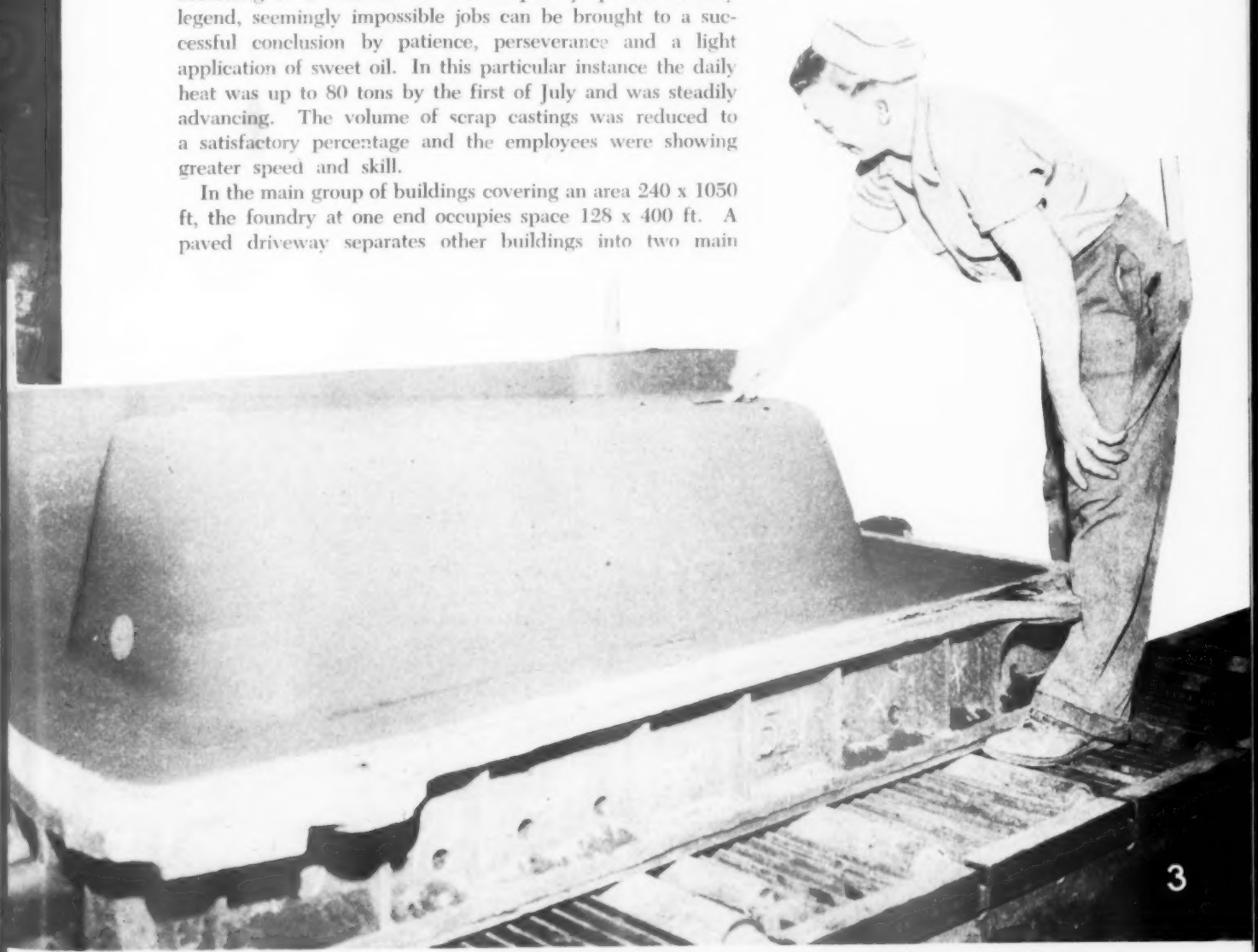


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Fig. 4—After the molds are shaken out the empty flasks are placed on a conveyor line and returned to the turntable molding station

Fig. 5—Three ladles are employed to pour metal into the bathtub molds

Fig. 6—Castings pass through a cleaning chamber

groups. The first group includes the boiler house, machine shop, frit grinding and smelting, supply room and storage. The second group includes the enameling furnace room, box shops, storage and warehouses from which the castings are shipped by truck or on a branch line of the Pittsburgh & Lake Erie railroad. A 24-in. sewer with manholes spaced 200 ft apart extends along one side of the group of buildings. A group of sand bins occupies the greater part of the space on the opposite side and alongside the railroad track. Raw materials, including pig iron, scrap, coke and limestone, are piled in the open yard. Iron is melted in three cupolas, employed alternately, two 66-in. diam, and one 75-in. diam inside the lining. An additional cupola lined to 72 in. was in process of installation at the time these data were secured, and probably will be in operation, before this article is published.

The plant is laid out for straight-line production, with raw materials entering at one end and finished product leaving at the opposite end. Castings from the foundry pass in succession through the cleaning room, the enameling department, the box shop where they are crated, and the storage, warehouse and shipping department.

At the time of writing three units were in operation in the foundry and several others were in prospect as soon as the manufacturers could deliver the necessary mechanical equipment, including cranes, conveyors and equipment for collecting, preparing and distributing the sand. Molds from each unit are placed on an individual power-driven roller conveyor. The molds are filled with metal while in transit and are shaken out on a powerful vibratory grating at the end of the line. The sand falls onto a belt which carries it back to the point of origin for reconditioning, the flasks are returned to the molding station and the red hot castings are placed on an adjoining floor where they are allowed to cool, before they are taken to the

cleaning room and later to the enameling ovens.

As a result of intensive investigation, sand from a Tennessee source is employed for making the molds. Permeability of the sand is between 60 and 70 and moisture content 4 per cent. This sand requires no artificial venting, resists the high temperature of iron tapped at 2700 F and peels from the castings without the use of any artificial binder or seacoal in the mixture, or any coating of carbonaceous material on the face of the mold. None of these materials can be used on molds for castings that are to be enameled.

As the late Dr. Moldenke points out in his well known *Principles of Iron Founding*, the special point interesting to foundrymen is the production of a surface on the castings which will hold the enamel under the firing process and let it come out without blemishes. The cleaner the iron surface is made so that no scale, graphite or roughness may be observable the better the chances for first quality product. Freedom from graphite is essential. Otherwise the enamel will not hold. Another very serious difficulty met with in enameling cast iron in the presence of tiny blowholes in the surface of the iron. These may be invisible to the eye because of a protecting layer of scale. When the bath tub, sink or other casting is introduced into the oven for preliminary heating previous to the application of the enamel powder, this scale may spring off, or the thin edge of iron may oxidize away. The result is enlargement or establishment of a minute passage between the surface and the tiny blowhole. When the enamel melts on such a spot, a bubble is formed by the expansion of the air within the hole and the piece has to be rejected.

These tiny blowholes generally are the result of steam formed by the contact of the molten metal with sand which either is too damp or cannot allow the steam to escape fast enough through the mold body. Strict attention to the sand conditions, as well as an iron mixture which will give a minimum of graphite at the surface of the iron without actually chilling it, will insure a desirable condition for enameling. In the Richmond Radiator Co. foundry, these features are controlled closely and accurately. Composition of the iron, melting and pouring procedure are standardized. A suitable grade of sand is prepared for use with the same meticulous care.

One of the units for making apron tubs is shown in Figs. 2 and 4. The unit includes a sandslinger, a turntable at floor level, two sets of cope and drag patterns and a sand hopper and chute for depositing the first layer of sand in the drag pattern. With the drag pattern spotted under the chute, the operator pulls a lever connected to a small air hoist, which in turn opens the gate in the chute and allows a measured amount of sand to fall into the pattern. The operator hops into the pattern and tramps the sand off to the proper density. It is claimed that no method of ramming developed up to the present can take the place of this age-old method of producing a large exposed sand surface against which the molten metal will lie quietly. The drag flask is lowered into place and the assembly is moved under the sandslinger, which rapidly fills the flask with rammed sand.

In the next move pattern and flask are lifted from the turntable, rolled over and placed on the conveyor which leads to the pouring station. Two 3-in. steel shafts connected to the pattern and extending horizontally through one end of the pattern base are turned by long-handle wrenches in the hands of two operators to lift the pattern straight and true from the mold for a distance of about 6 in. Air lifts will be used as soon as available. A beam and slings suspended from a crane lift the pattern clear of the mold, roll it over and replace it on the turntable where the sequence is repeated. Flasks, cope and drag follow each other steadily and in regular order. The cope is not rolled over. It is lifted from the pattern by an air hoist. A four-way sling chain lowers it on to the waiting drag.

Extra heavy one-piece cast iron flasks, ribbed and braced on the outside, are required to withstand the comparatively rough handling to which they are subjected. Flasks are interchangeable, machined on the joints and drilled with the greatest accuracy for the guide pins. Castings are only ¼-in. thick and the least shift between cope and drag would result in a scrap casting. Any lack of uniformity in thickness would cause the casting to crack or warp during the subsequent heating and enameling process. Castings are made in three lengths, 54, 60 and 66 in., and in weight 275, 285, and 355 lb.

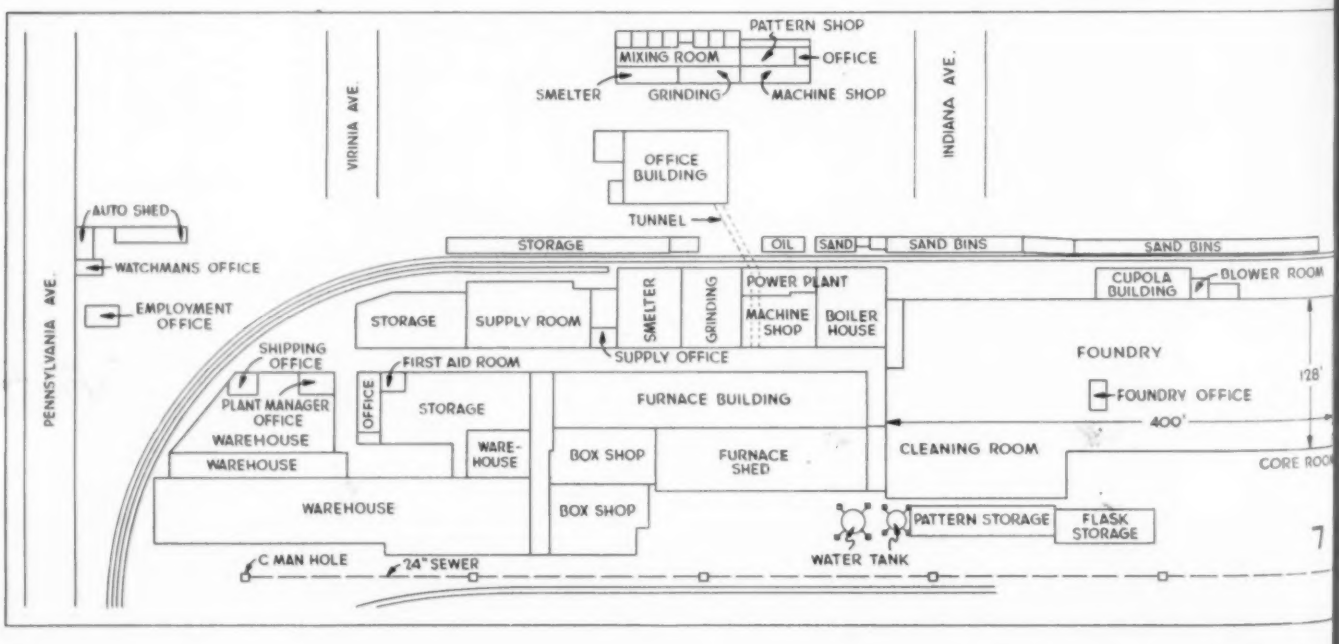
After each mold is closed it is placed on the exposed end of a long roller conveyor. Here it is engaged by a hydraulic device which pushes the whole train forward one length to make room for the next mold arriving from the turntable. About halfway along the line the molds in succession are filled with metal from three ladles, one at each end and the third at one side. Metal enters the mold through a number of thin flat gates at the lower edge of the mold. Obviously, hot fluid metal must be poured fast to climb up in the narrow mold space and cover the great inside mound of sand without a wrinkle or cold shut. To the foundryman unfamiliar with this class of castings, the feat is impossible. "What's that?" he will say. "Drive iron up hill between the heat robbing walls of a green sand mold, to cover an area of approximately 44 sq ft, and only ¼-in., thick? Simply can't be done, son!" The bathtub people do it every day. Like Ol' Man River, they don't say nothin' but just keep rollin' along. Rolling the tubs off the conveyor lines, through the cleaning room, the enameling furnaces and out through the shipping room for destinations anywhere between the Atlantic and the Pacific and from the Great Lakes to the Gulf of Mexico.

Porcelain enamel used as coating on cast iron sanitary ware is a form of glass, and in fact it is known as glass while in course of preparation. Two distinct mixtures are used in applying it to the castings. The first is known as the slush or wet coat. The second is the enamel itself, or the finishing coat. The slush is the base which binds the enamel to the metal. To some extent the ingredients must unite with the metal itself and not act merely as a glue. Manufacturers of enameled sanitary ware have developed individual formulas for the slush coat and finishing enamels. While general knowledge on the various ingredients employed is common, the proportion in which the ingredients are mixed is regarded as private and is not available for publication.

As the name implies, the slush coat is a liquid, gray in color and about the consistency of thin paste or claywash. Formerly it was applied to the castings by an operator who dipped it out of a tank in a cup and threw it over the surface. A spraying apparatus now is employed for the same purpose. The spraying device is more efficient in that it distributes the material more uniformly. Therefore a smaller quantity of slush covers a given area. Also the method is considerably faster, especially on bathtubs and other large castings. After the slush has been applied the casting is set to one side and allowed to dry thoroughly. Pin holes or other minor defects are touched up by the enameler before the casting is placed in the furnace.

Maintaining the proper temperature to melt the slush coat fast enough to make it (*Please turn to page* 156)

Fig. 7—The plant is laid out in a straight line to facilitate movement of castings from the foundry and through other departments



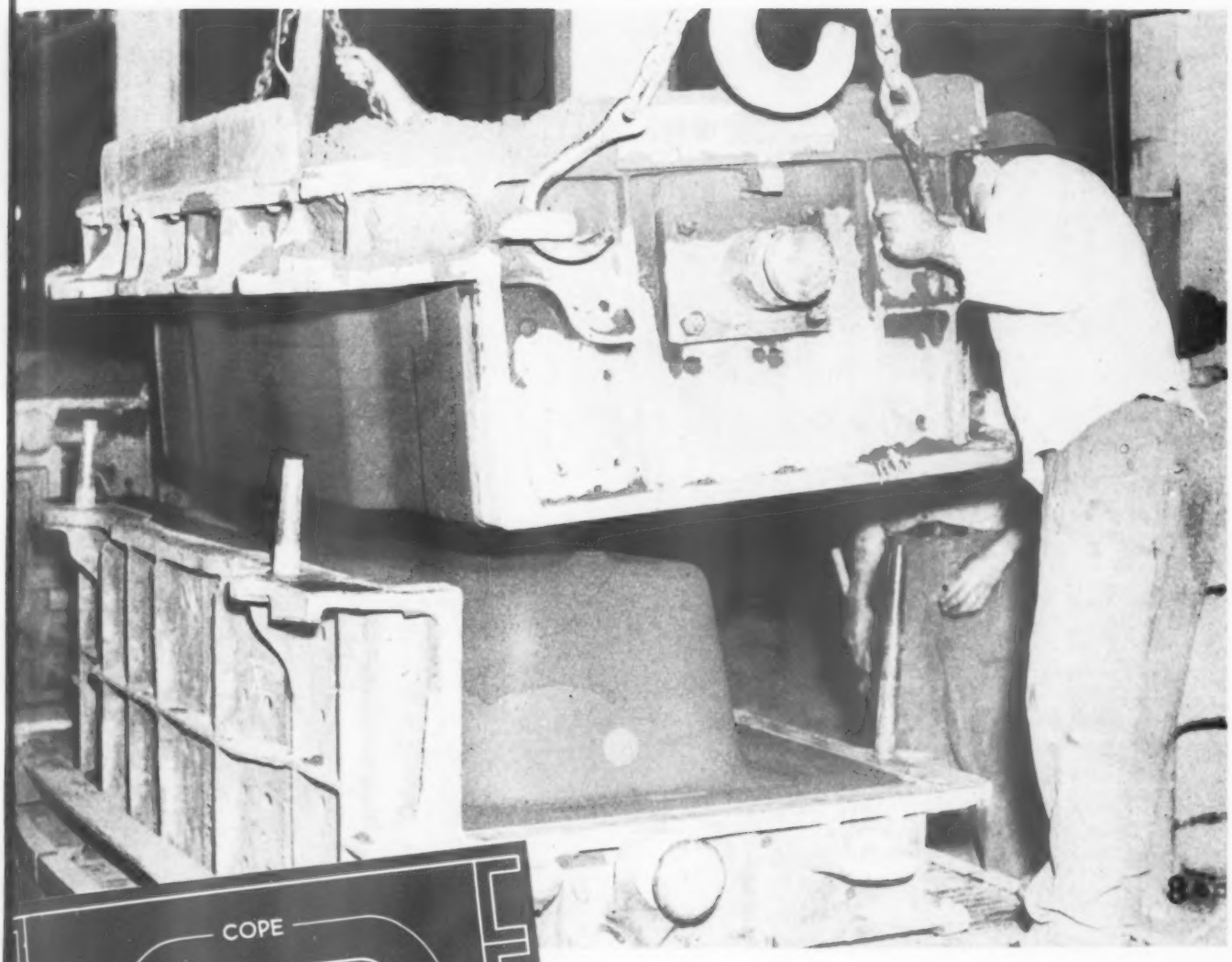


Fig. 8—Extra long pins on the low side of the flask guide the cope when it is lowered onto the drag

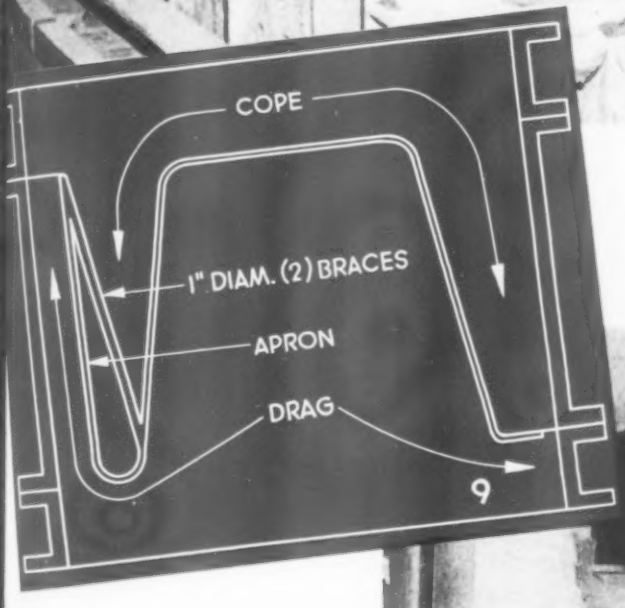
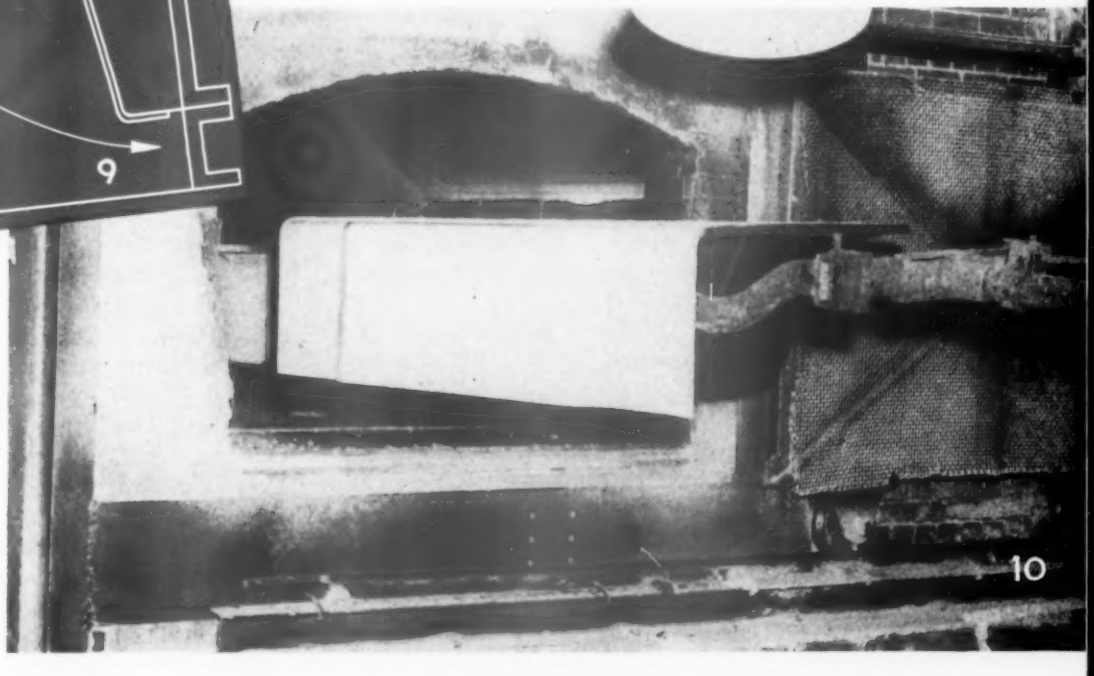


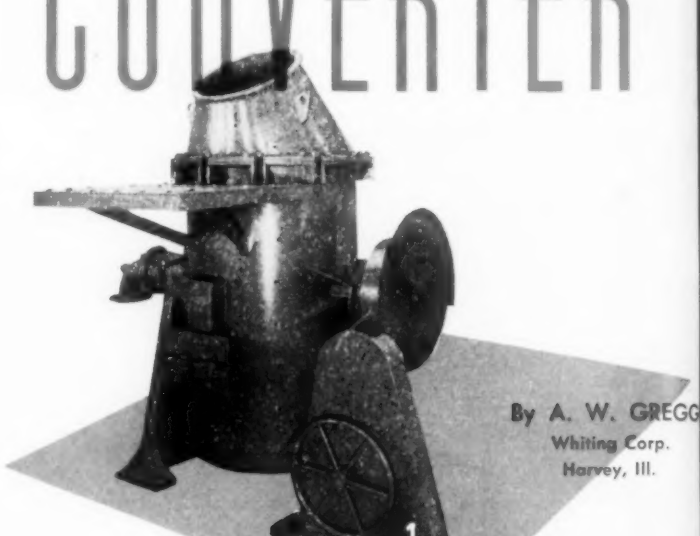
Fig. 9—Freehand sketch not drawn to scale showing sectional view of bathtub mold and apron brace

Fig. 10—A special fork is employed to convey castings into and out of the enameling furnace



The SIDE-BLOW CONVERTER in the Postwar Period

By A. W. GREGG
Whiting Corp.
Harvey, Ill.



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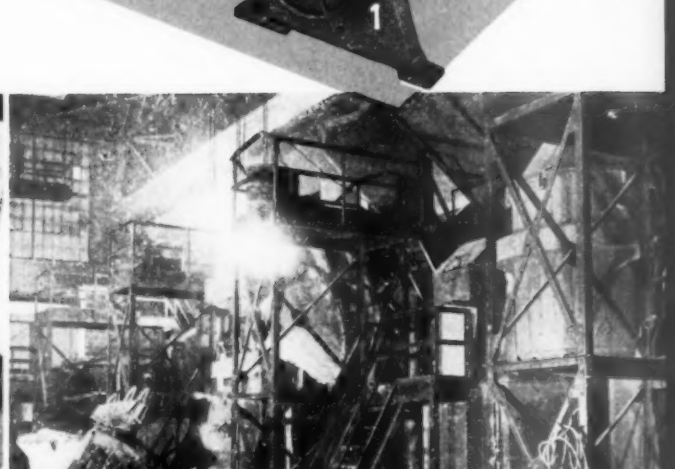


DURING the last five or six years some fifty new side-blow converters were installed in the foundries of this country; in addition some old vessels which had not been used for years, were dragged out of corners and once more put to work making steel.

The following table was included in an article in *Steel Foundry Facts* published serially in the May and June, 1945 issues. The article was written by C. W. Briggs, and the table shows the number and size of converters in use and on order in January, 1944.

	Capacity, Tons					
	1	1.5	2	2.5	3	4-6
Number	16	5	25	3	12	5

The question is often raised of whether the increase in use of converters was due to the extra production required for the war effort, or if it means a revival in use of the converter to produce steel for casting. Because of a number of reasons the side-blow converter was in the "doghouse" from about 1916 until about 1940—or from World War I to World War II.

Inability of the acid converter process, at the time of the first war, to control the sulphur content of the steel was one of the principal reasons which put the converter in the discard. The great demand for steel castings during World War II was an important factor in the renewed interest in the converter.

The work of Sims and Dahle of Battelle Memorial Institute did a great deal to dispel the prejudice against converter steel which existed prior to the recent war. Results of this research project were reported in Volume 42—1942 of the *Proceedings*, American Society for Testing Materials. Exhaustive tests, both static and dynamic, at

Fig. 1—Side-blow converter, ½-ton capacity
Fig. 2—Two 1-ton converters in operation. Cupola at left
Fig. 3—Four 6-ton side-blow converters
Fig. 4—Electronic flame control equipment in use

A recent article by John Howe Hall was published serially in the April, May and June, 1946, issues of THE FOUNDRY discussing bottom and side-blow converters. Mr. Hall stoutly defends the quality of side-blow converter metal.

In Europe the converter process was never abandoned as it was in America. During the recent war two-thirds of all ordnance steel castings in England were made from side-blow converter metal. The same thing was true in Germany as evidenced by the report on the German steel casting industry by C. W. Briggs, which was published in the April, 1946, issue of THE FOUNDRY. Tables are included with this article showing the production of liquid steel for castings in Germany, by processes, for 1943 and 1944. It is interesting to note that the tonnage of converter steel exceeded even that for the open hearth, as follows:

Year	Open Hearth	Electric	Converter
1943	593,282	503,591	594,762
1944	567,182	569,157	671,163

Federal specification No. QQ-S-681B for steel casting was issued on Nov. 6, 1941, superseding No. QQ-S-681A which had been issued five years earlier. The "A" specification listed the open-hearth, electric, converter and crucible furnaces as approved processes, but the "B" specification under section C-1 read as follows: "Unless otherwise required or approved by the design agency concerned, steel castings shall be made by one or more of the following processes: Electric Furnace (Arc or Induction) or Open-Hearth." In effect, this put the converter and the crucible processes in the discard.

The exclusion of the converter and crucible processes, not on the basis of quality, but simply *as processes* raises the question if it is fair to specify against a process which can produce metal which will meet all chemical and physical requirements of the specification. Certainly specifications should prescribe all chemical and physical properties necessary to insure satisfactory service from

ordinary and subzero temperatures were made on open-hearth, electric, converter and triplexed steels all having been given identical heat treatments. The conclusions drawn were eminently fair and no evidence was found to favor one process over another so far as quality is concerned.

The development of electronic flame-control equipment by the research department of the Jones & Laughlin Steel Corp. was an important factor in creating renewed interest in converter operation. This equipment catches the end point of the blow with greater accuracy than is possible for the human eye, and blowing loss is reduced in most cases, because the equipment indicates when a boil is about to occur. This enables the operator to reduce the pressure of the blast before a violent reaction takes place with attendant slopping and loss.

steels and other materials for the particular application involved. If steel can be made on the kitchen stove which will meet all chemical and physical requirements of a specification, why isn't that the concern of the vendor rather than that of the specifying agency?

When QQ-S-681B was issued, a storm of protest arose, not only from manufacturers of converter steel, but also from technical research organizations, and from fair-minded manufacturers of steel by other processes. It was recognized that a specification barring out the converter as a process, might conceivably establish a precedent to bar out any process in favor of some newly developed and presumably superior method of producing steel.

The Sims-Dahle report, to which previous reference has been made, was presented at a meeting of the ASTM in June, 1942. Largely as a result of the data presented in this report, which has been checked and confirmed by other agencies, an amendment to QQ-S-681B was issued on Aug. 24, 1943. I quote from this amendment as follows:

Paragraph C-1. "Delete paragraph and substitute:—Unless otherwise specified, steel for castings shall be made by one or more of the following processes: Open-Hearth, Electric, Converter or Crucible."

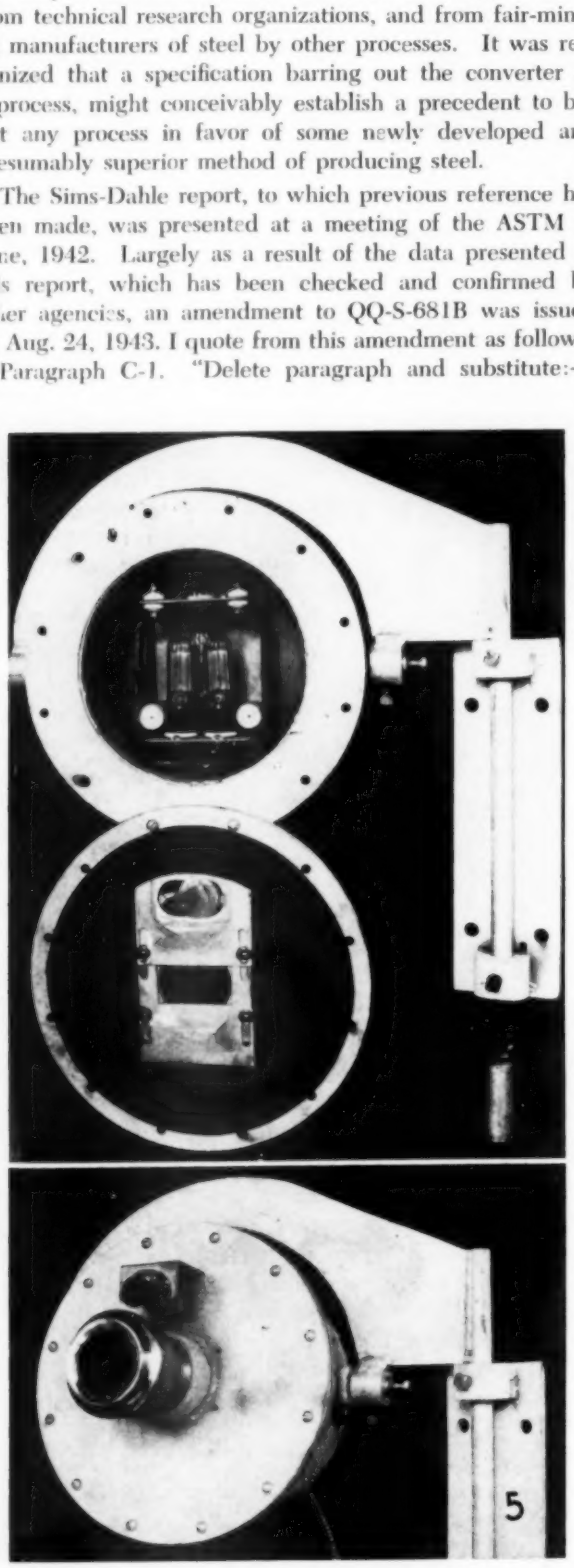


Fig. 5—Electronic flame control equipment for converter use. In top view instrument is open to show photo cells

New Converter Installations—New converters installed during the war produced variable results. Some of them went into iron foundries with no previous experience in steelmaking and with inadequate personnel for the manufacture of steel castings. The converters which went into the larger plants having laboratories, good foundry facilities, metallurgical staffs and excellent supervision did a first-class job of making steel castings.

As shown in the table quoted from Mr. Briggs' article, the usual range in size for converters in the steel foundries has been from 1 to 3 tons, with the 2-ton size the most popular. Many good operators believed that converters smaller than 1 ton or larger than 3 tons would have no practical application.

Three ½-ton converters have recently been installed—one in a research laboratory, one in a steel foundry and one in an iron foundry. The converter in the research laboratory has blown successful heats with charges as small as 500 lb. Admittedly, it is very easy to lose the flame when blowing such a small amount of metal, and 500 lb is too small a charge for anything except experimental blows.

Small Converter Has Many Uses

The second mentioned vessel made steel castings for several years in a small foundry in Mississippi using a 1200-lb charge. Blows were turned down on a ten-minute cycle. This foundry has temporarily given up the manufacture of steel castings and will devote all of its capacity to cast iron.

The third small converter has been installed in a small iron and steel foundry in Tennessee, but has not yet been put into operation. It is planned to use this converter to make small steel castings, and also to blend blown metal with cupola metal to produce high strength cast iron.

An iron foundry in the Chicago territory is also planning to install a small converter for the production of high strength iron, by blending metal from the converter with cupola metal. High strength cast iron depends to a great degree on control of the carbon content, and this can be very accurately accomplished by blending blown metal with cupola metal. If the converter heat is full blown, the carbon content will be in the neighborhood of 0.05 to 0.08 per cent. Composition of the metal from the cupola should be definitely known, and will probably be in the range of 3¼ to 3½ per cent. To obtain any carbon content in the blended metal between these two percentages, is a matter of simple arithmetic and careful weighing.

Several years ago a prominent manufacturer of castings made the well known copper-silicon steel, with a carbon content of approximately 1½ per cent, by blending cupola and converter metal in approximately equal proportions. This metal, after a six-hour anneal, showed a tensile strength of about 100,000 psi with an elongation of 7 to 8 per cent.

Cast iron today is being generally recognized as a valuable engineering material, and it seems logical to expect that demand will increase for high strength cast iron having 50,000 to 60,000 psi and more. The small converter should prove to be a very valuable and useful tool in foundries manufacturing this (*Please turn to page* 158)

Beating THE COKE SHORTAGE

For many foundries recently coke has become the scarcest of leading raw materials, superseding in this respect both pig iron and scrap. Since coke consumption per ton of iron produced in the foundry varies widely among different plants, numerous opportunities exist for more economical use of what limited supply of fuel is available. The purpose of this article is to repeat recommendations which have been made in the past for most efficient cupola operations. The editors of THE FOUNDRY will welcome additional recommendations that may prove helpful to the industry in this emergency.

HOW to meet the growing shortage of metallurgical coke is becoming an increasingly serious question for many foundrymen, particularly since there is little assurance that the volume of coke currently available for foundries will not decrease further in coming months. Consequently, it appears mandatory for every cupola operator to look to his practice with the view of obtaining the most economical fuel consumption without affecting the present satisfactory quality of the iron.

Many will point out that since coke is the cheapest of the raw materials entering the cupola, it is foolish to try to save a few cents by reducing the amout used, and thereby run into possible trouble. However, it is not so much of a question of saving money as it is conserving a rather scarce, essential commodity. On the other hand, a saving of $10 a day and probably much more, representing the value of coke saved, is a possibility that should not be overlooked. It is well known by those highly versed in the art of cupola operation that a wide range of practices is possible which is indicated by beds ranging from 24 to 50 or more inches in height above the tuyeres, coke-to-iron ratios of from 1 to 5 to 1 to 12 or more, not to mention a wide variation in blowing rates.

The literature contains a wealth of information on methods of cupola operation to secure a satisfactory product, and it seems to be the consensus that there is no blueprint or absolute rules for standard cupola operation. As Tom E. Barlow, Battelle Memorial Institute, recently pointed out at one AFA chapter meeting, that is due to the fact the cupola blowing systems are not exactly alike, patching operations are dissimilar, preparation of and ignition of the coke beds differ, desired temperatures of the irons are not the same, etc. However, there is agreement that a standard procedure can be set up for a cupola which will provide the most economical operation under specific requirements of metal temperature and composition, melting rate, etc.

Most important phase of good cupola operation, according to Mr. Barlow, is adequate and expert supervision. This will insure proper preparation of the cupola from patching to burning in the bed, use of correct iron and coke splits, right blowing practice, and will result in uniform melting rates and a satisfactory final product.

To a large degree the successful operation of a cupola depends upon the proper height of bed above tuyeres. At this point it should be mentioned that the tuyeres should be located as closely as possible to the sand bottom. Don Reese in an article, "Cupola Melting of Cast Iron," in the July, 1946, issue of THE FOUNDRY states on this point: "Temperature of metal tapped from a cupola the first part of the heat is proportional to the temperature of the cupola well zone . . . . Whether the metal is hot or cold on the first tap and for several subsequent taps is a function of the elevation of the tuyeres above the sand bottom. As cupola refractories are 4 in. high this elevation might be as low as 8 in. or more than 24 in. The man who understands cupola operation would keep this elevation as low as is practical." Hence, if it is not necessary to hold a large quantity of metal in the cupola well, a saving of coke can be made by reducing the height of the tuyeres above the bottom.

Height of the bed above the tops of the tuyeres, according to the *Handbook of Cupola Operation* (AFA, 1946), must be determined by experiment. As a base on which to begin such experiment, A. J. Edgar in the October, 1946, issue of THE FOUNDRY discussing the "Correction of Foundry Waste" suggests the following formula: "Bed height in inches of coke above the level of the top cover plate of the main row of tuyeres (and irrespective of the use of one or more rows of upper tuyeres), is equal to $10.5 \sqrt{P} + 3$, when P is the cupola windbox pressure in ounces. This is the height when low carbon irons, i.e., 2.76 per cent C or lower are desired and particularly when the requirement is for the first iron melted. With medium carbon irons, i.e., 3.25 per cent or higher, I use 3 more inches of coke, or use the formula B. H. $= 10.5 \sqrt{P} + 6$. . . . . When coke bed heights are too low, overall foundry operations are off to a bad start, for carbons are likely to be low, silicon and manganese oxidation losses high, with metal temperature low and getting worse. It is difficult to readjust bed height during operation. Usually low bed heights reflect abnormally large intermediate coke charges."

With the bed established according to either of the formulas the next step is to determine if that is the optimum, and that can be found only by following a definite procedure. The bed must be burned in properly by observing a strict time schedule as to the length of time allowed for ignition, burning under natural draft, and use of the blower. After the most (*Please turn to page* 161)

Steel Castings Produced CENTRIFUGALLY

By EDWIN BREMER
Metallurgical Editor
THE FOUNDRY

Application of centrifugal casting procedures to the production of steel castings has made great strides the past few years. This article describes features of equipment and practices employed by the Youngstown Alloy Casting Corp.

SEVERAL years ago the Youngstown Alloy Casting Corp., Youngstown, O., producer of wear and heat resistant alloy steel castings for steel pipe and tube manufacture and for steel rolling mills, became interested in the possibilities of centrifugally casting some of its products. Main attraction of the process was the potentiality of increased yield, since requirements of soundness necessitated heavy risering in static pouring—so much so that with certain castings the yield was only 22 to 25 per cent.

Careful consideration of various aspects of the centrifugal process indicated the wisest course to follow would be the installation of a small experimental unit. From this it would be possible to determine at first hand the advantages and limitations as applied to specific castings. In studying available information on centrifugal casting equipment the thought occurred to J. Trantin Jr., president of the firm, that a fluid or hydraulic drive offered certain desirable characteristics such as direct attachment, smooth acceleration and operating features.

Securing a constant displacement pump and drive motor, experimental work was begun which culminated in a unit providing smooth stepless rotation of the table from minimum to maximum speed. Present installation at Youngstown Alloy Casting Corp., as shown in Fig. 4, includes 20 vertical type, casting machines located in pits and in two rows of five each, one row containing eight machines with two other machines installed separately nearby. Machines arranged in the rows have 24-in. tables while the other two have 18-in. and 72-in. tables. Each of the units is driven by a fluid motor attached to the lower end of the shaft which rides on two ball bearings. One of the bearings is located near the top and the other near the bottom of the shaft.

Hydraulic power to drive the units is developed by twin pumps mounted in tandem and driven by a 5-hp electric motor. Each pump drives a casting machine, and the tandem mounting permits operation of two machines with only one motor. While this may seem unusual, it is explained by the fact that only at the beginning of spinning

Fig. 1—After the molds have been sprayed and dried they are taken from the conveyor line and assembled on the tables of the casting machines

Fig. 2—Partial view of the assembly line showing the setting of cores in the baked mold

Fig. 3—Another view of the mold conveyor line where the mold faces are sprayed with a refractory coating and finished to give a smooth surface

Fig. 4—Centrifugal casting machines are driven hydraulically, with the pumps or motors located in pits shown in the foreground

Figs. 5 and 6—Some of the castings produced by centrifugal casting indicating the methods of gating used

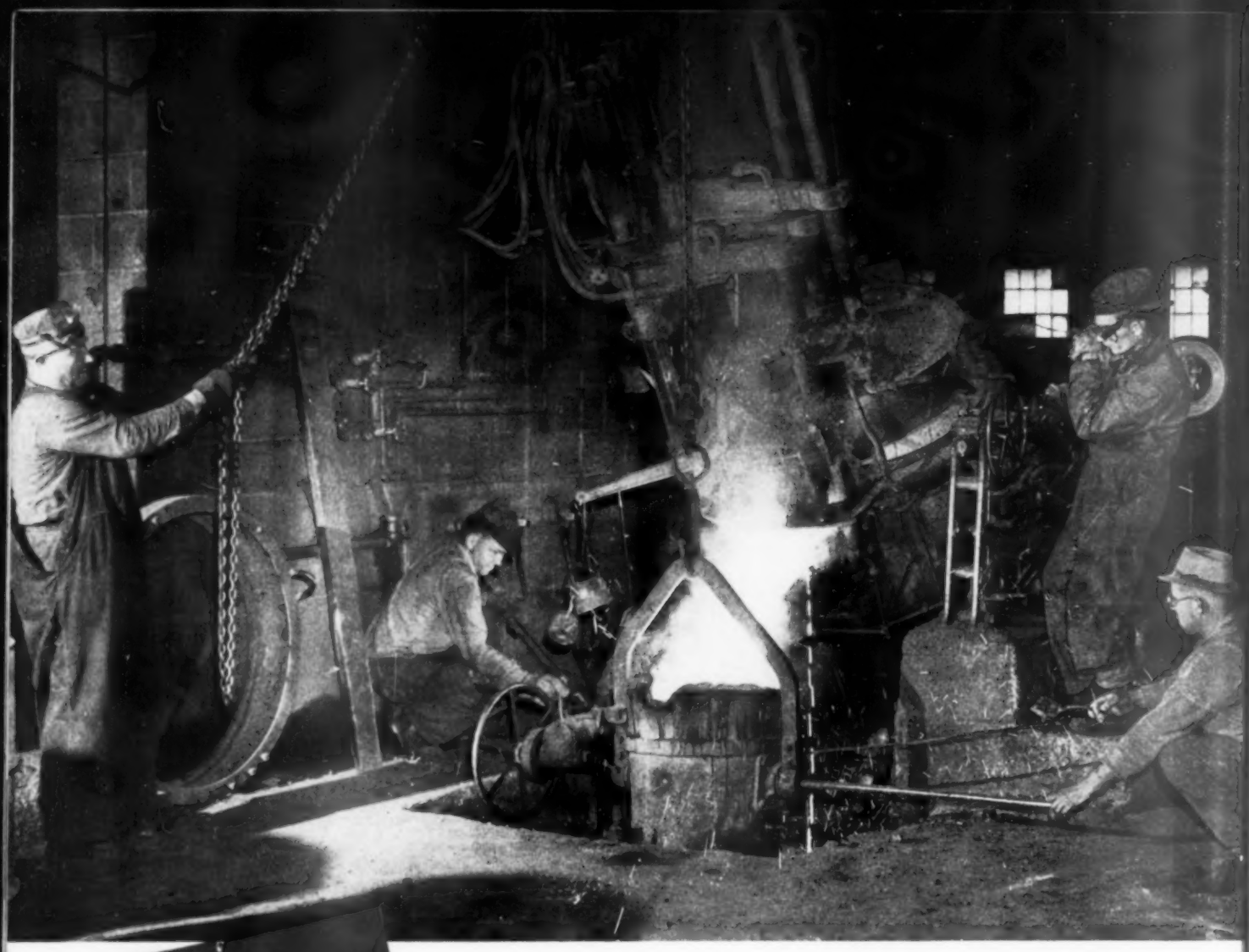
the machines is a high torque required to start the heavy load rotating. After that is accomplished comparatively little power is needed to maintain the speed. Power generating units are located above the floor level adjacent to the machines.

Later developments in the centrifugal casting equipment include the use of heavier duplex constant-displacement pumps which permit the operation of any number of machines, total enclosure of shaft and bearings so that they run in oil, and a compact, column-mounted control panel. Maximum metal and mold load which can be handled depends upon table, pump and electric motor size, and range from 600 lb for the 18-in. table to 3000 lb for a 36-in. table. Electrical horsepower input ranges from 2 to 5 hp. The large machine which is designed to carry a maximum load of 5500 lb employs a single hydraulic pump driven by a 7½-hp electric motor. Tables contain six radial T-slots for attaching flasks or curbing.

Castings produced by the firm are made by both the true centrifugal process, whereby the center of rotation of casting and machine coincide, and by centrifuging, wherein the casting cavities are arranged radially around the sprue at the center of rotation and are connected to it by straight or curved passages. The latter are preferred, and the direction of curvature is the same as that of rotation so that the metal is pushed into the casting cavity. All molds are made of a fine-grain Geauga sand bonded with core oil and cereal binder, and baked. Method of arrangement of castings in a mold will depend upon the size and conformation, and may range from only one in a mold up to 48, as indicated in the accompanying illustrations.

Figs. 9, 10 and 11 show the molds in various stages of preparation for centrifugally pouring the 1600-lb roll casting illustrated in Fig. 8. Face width of the casting is about 5 in. and the rim thickness about 4½ in. External diameter of the roll is 46 in. The two webs are 1-in. thick and reinforced by eight heavy ribs on the interior. As may be observed from Fig. 10, the casting is gated into the webs at two opposite points; the gates being 1 x 2¾ in. Another pair of gates is located immediately below those visible in the illustration.

The other extreme in centrifugal casting is depicted in Fig. 13 where 42 high-speed compressor crankshafts are made at one pouring. The "Christmas tree" appearance is accomplished by placing a series of molds on top of one another and cementing, pasting or mudding them to prevent shifting. The common central sprue is stopped off in the drag of the bottom mold so that the molten steel can-



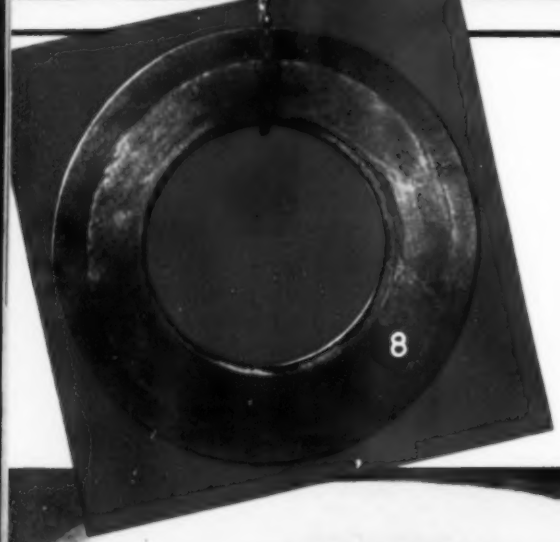


Fig. 7—Steel for the castings is melted in a 1000-lb direct-arc electric furnace and tapped into a bull ladle which is transported to the pouring floor. There the molten metal is transferred to smaller ladles used for pouring the molds

Fig. 8—A 1600-lb roll casting 46 in. in diameter with a face 5 in. wide. Various views of the mold in which it was made are shown in Figs. 9, 10 and 11

Fig. 9—Finished drag mold for the casting shown in Fig. 8 before setting the cores

Fig. 10—Appearance after the cores are placed in position showing the location of the gates into the top web. Similar gates below admit metal to the lower web

not escape at that point. As may be seen in the illustration the throws of the crankshafts are cored out while the shafts and counterweights are solid.

Fig. 5 illustrates the method of gating two flying shear knife holders and a double flanged roll. The knife holders are about 5¼ in. in diameter and 1½ in. thick. Hole on the inside is 2¼ in. in diameter and is formed with a core through which runs the 1¼-in. diameter sprue. Gates from the sprue enter into the boss or projection on the upper surface and are about ½ x ¾-in. The double-flanged roll at the right is 5½ in. in diameter with an overall height of 7¼ in. Casting is gated into diametrically opposite points on the upper flange. Gates are about 1 x 1¾ in.

One type of casting produced in reasonably large quantities by the Youngstown Alloy Casting Corp. is the seamless tube rolling mill plug of which two sizes are shown in Fig. 12. The one in the center is 11 in. in diameter at the largest point while those at the right and left are 5 in. in diameter. the castings are hollow with about 1 in. metal thickness. As may be surmised, the larger sizes are produced one in a mold while the smaller sizes are made by stack or multiple molding. In the latter procedure the top of one mold serves as the drag for the one on top of it, with flat cores at the bottom and top of the series. Since in this particular case the cavities for castings and those for the gates are incorporated in one mold, the molds are staggered so that casting cavities are not in line.

Fig. 6 shows several sizes of seamless tube piercer points which are made one in a mold. Method of gating, as clearly indicated, is into the top of the castings at two points diametrically opposite. These points are joined with a runner having the sprue in the center.

One of the most important features of producing quality alloy steel castings, according to the management of the company, is finishing the mold face preparatory to closing for the reception of molten metal. Exercise of a little care in executing that operation insures a good surface on the casting as well as clean stripping from the sand. To provide adequate facilities for proper finishing of molds an L-shape conveyor line with legs about 40 ft long was installed on which the molds are sprayed with wash, dried, and the cores set when required.

Partial views of the system are shown in Figs. 1, 2, and 3. In Fig. 2 the dried or baked molds are being sprayed and painted with a zircon flour wash. Molds are on steel bottom boards and are pushed along the conveyor by hand. Following a short period of air drying the molds enter a gas-fired tunnel oven about 8 ft long where the wash is dried thoroughly. After leaving the oven and cooling somewhat the molds are ready for any core setting that may be involved, and that operation is partially illustrated in Fig. 2.

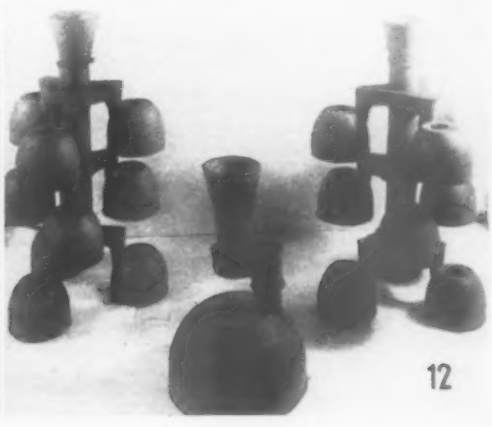
Following the coring operation the molds are pushed toward the end of the conveyor line, as indicated in Fig. 1. End of the conveyor line is in close proximity to the centrifugal casting machines so that the molds have to be carried only a short distance to be placed in position on the machines. Considerable care is taken in setting the molds on the machines so that their vertical axes are concentric with those of the casting machines. After the bottom mold is located the other mold or molds are placed in position, and then a circular steel slip jacket formed of ¼-in. plate is forced down over the joints, as may be observed at the left of Fig. 1.

The hinged jack or flask, (*Please turn to page* 194)

Fig. 11—Joint between cope and drag is carefully pasted to prevent any leakage, and then the joint is mudded on the outside for double insurance

Fig. 12—Method of arrangement of castings in the mold will depend upon the size as indicated in this view of seamless tube rolling mill plugs. One in the center is 11-in. diameter made one in a mold while in the case of the 5-in. diameter plugs to the right and left, nine are made in a mold

Fig. 13—Small castings such as these high-speed compressor crankshafts are located in a "Christmas tree" arrangement attached to a central sprue. Forty-two castings comprise this grouping



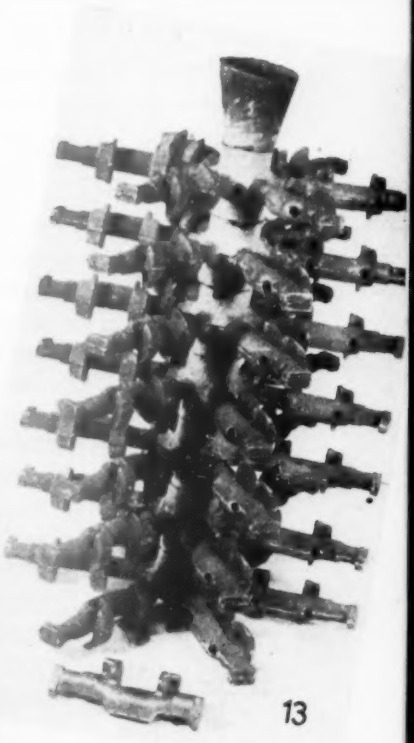
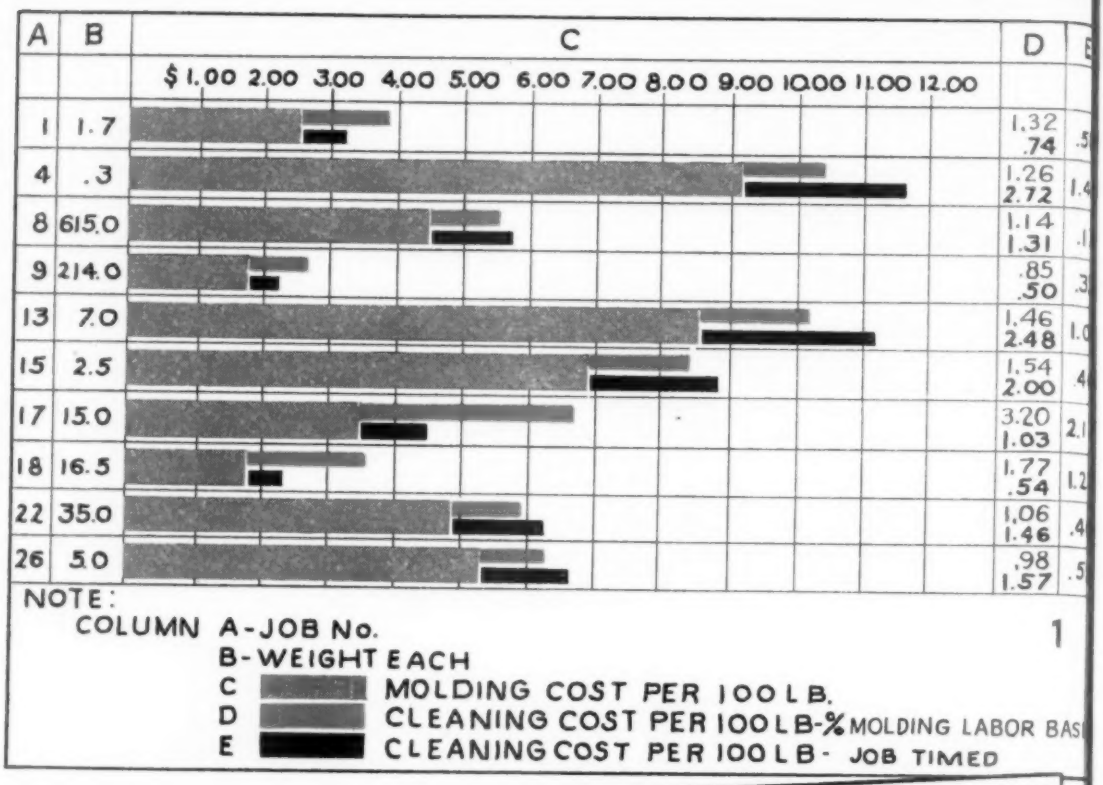
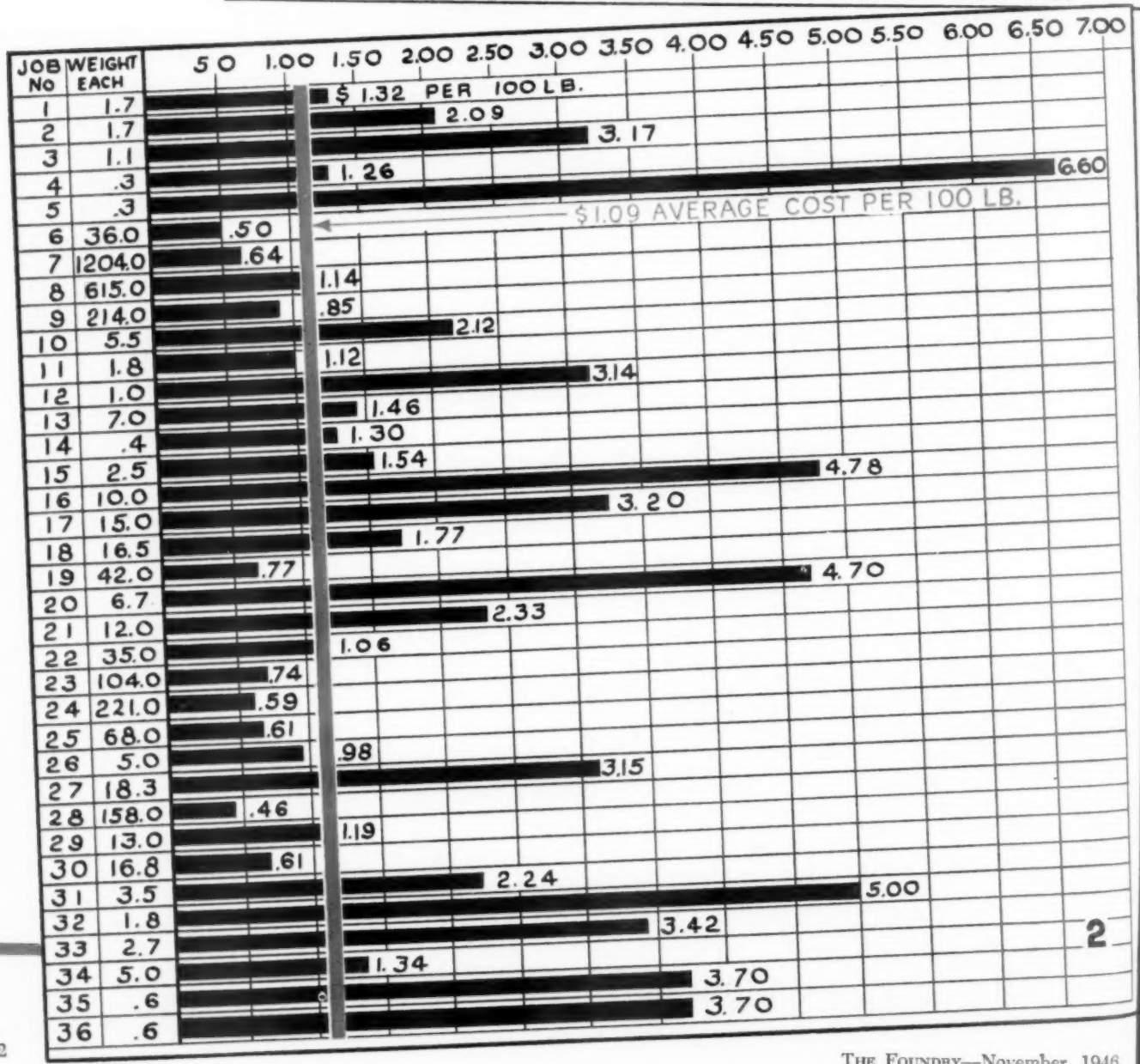


Fig. 1—Chart showing variation in cleaning cost estimates when cleaning department costs are included in molding overhead, as compared with figuring on measured time basis

Fig. 2—Although $1.09 per 100 lb is average cost of cleaning castings in this shop when figured on the basis of weight cleaned, actual cost for individual castings ranges from $0.46 to $6.60





CLEANING COSTS

In a small gray iron foundry

By ALBERT E. GROVER
Cost Consultant
Cleveland

DURING the discussion of casting methods at the recent American Foundrymen's Association Congress, a suggestion was made that it would be fairly accurate and inexpensive to calculate the cost of cleaning castings on the basis of weight of good castings. That is, by the following formula: Total Cleaning cost ÷ Pounds Cleaned = Cleaning Cost per Pound.

The representative of one gray iron foundry stated that in his foundry there are castings which take four times as long to clean as others of equal weight, therefore he could not see how dependable costs could possibly be obtained by the suggested method.

During the author's contact with methods of applying cleaning costs to individual jobs he has found certain foundrymen who recommend including the entire cost of the cleaning department in the overhead of the molding department according to the following formula: (Molding Overhead + Cleaning Department Cost) ÷ Molding Direct Labor = Overhead Rate.

Another group of foundrymen measures the time required to grind, brush, chip and sandblast individual jobs and uses it as a basis for calculating both labor and overhead costs of this operation. Where employees are paid by the hour the following formula is used:

Cleaning Time × Hourly Wage = Direct Labor Cost. Cleaning Time × Hourly Overhead Rate = Overhead Cost. Direct Labor Cost + Overhead Cost = Cost of Operation.

Where payment is based on piece work, the formula is as follows:

Pieces Cleaned × Piece Rate = Direct Labor Cost. Cleaning Time × Hourly Overhead Rate = Overhead Cost. Direct Labor Cost + Overhead Cost = Cost of Operation. (*Please turn to page* 188)

Daily Cleaning Cost in a Gray Iron Foundry

		Total Department	Tumble	Chip Grind Sandblast
LABOR COSTS:				
OPERATORS		11	2	9
Operating hours (8-hr day)		88	16	72
Wages (at $1 per hr)		$88.00	$16.00	$ 72.00
SUPERVISION:				
Superintendent—Monthly salary	$500.00			
—Applied to other dep'ts	400.00			
—Applied to cleaning	$100.00			
Monthly salary of foreman	200.00			
Total monthly supervision	$300.00			
Supervision for one day:				
Monthly supervision $300.00 / Working days in month (20) =		$15.00	$ 2.30	$ 12.70
TRUCKERS (2 men)				
Operating hours (8-hr day)		16	3	13
Wages (at 90c per hr)		$14.40	$ 2.70	$ 11.70
CLERICAL				
Monthly salaries:				
One office clerk	$200.00			
One shop clerk	175.00			
Total	$375.00			
Applied to other departments	310.00			
Applied to cleaning department	$ 65.00			
Clerical for one day:				
Monthly clerical $65.00 / Working days in month (20) =		$ 3.25	$ .50	$ 2.75
TOTAL WAGES AND SALARIES		$120.65	$21.50	$ 99.15
TAXES, INSURANCE, AND OTHER LABOR EXPENSES		4.82	.86	3.96
TOTAL LABOR COSTS		$125.47	$22.36	$103.11
DEPRECIATION		12.00	8.75	3.25
PROPERTY TAXES AND INSURANCE		2.00	1.20	.80
COST OF HEATING DEPARTMENT		3.00	1.00	2.00
COST OF ELECTRICITY				
Light		1.75	.50	1.25
Power		8.40	6.30	2.10
MAINTENANCE and REPAIRS		19.00	14.00	5.00
SUPPLIES		10.00	3.00	7.00
TOTAL COST TO OPERATE DEPARTMENT ONE DAY		$181.62	$57.11	$124.51
POUNDS CLEANED 16,707				
COST PER 100 LB CLEANED— $1.09				

Impregnation of Magnesium Alloy Castings

By HERBERT DOBKIN
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SINCE the physical properties of magnesium alloys are not affected seriously by microporosity in the usual commercial amounts, castings containing this defect should ordinarily be usable without fear of detrimental consequences. However, many magnesium alloy castings are specified for service conditions where they are required to withstand internal liquid or gas pressures of 2 to 3 atmospheres. The author's experience, for example, has included the use of magnesium alloy castings for oil manifolds, compressor casings, and similar parts for use in aircraft turbosuperchargers, gas turbines and jet propulsion engines, where such pressures commonly are encountered.

As explained in the preceding article ("Microporosity in Magnesium Alloy Casting," THE FOUNDRY, October, 1946), even minor amounts of microporosity, within the amounts usually encountered in commercial castings, can cause leakage in such applications. Since castings used in these applications are pressure tested prior to service operation at pressures up to 50 per cent above the operating pressure, most of these castings would have to be rejected because of leakage in spite of being perfectly sound physically. All of the work on the problem thus far has resulted in merely being able to minimize microporosity, or to segregate it in low stressed areas of the castings. It has not been successful in eliminating microporosity entirely, due to the fundamental nature of its occurrence in magnesium alloys. In order to minimize the amount of scrap and rejections due to leaky castings, impregnation methods were developed specifically for the purpose of sealing up the porous areas in these castings and eliminating the leakage under pressure service.

Basically, impregnation is merely a method of sealing up the porosity in castings. In practice, however, the methods of impregnation are far advanced and refined. Ordinarily, the easiest method of impregnating would be to dip the part into a sealing compound and allow the compound to dry on the surface. For most applications however, where close machining dimensions are specified, such a surface film could not be tolerated. The methods in common use today consist of actually forcing the sealing compound into the

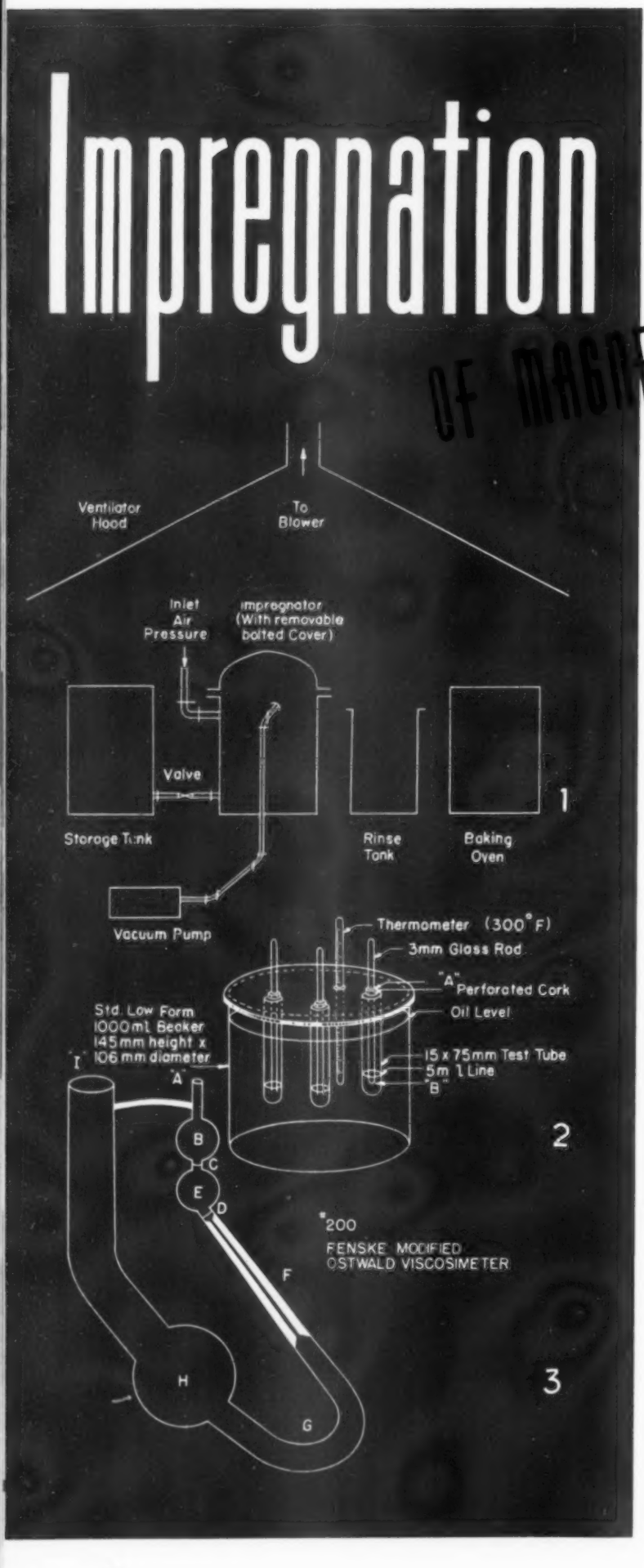


Fig. 1—Layout of equipment for batch impregnation with styrene-linseed oil copolymer

Fig. 2—Laboratory setup for measuring polymerization time of styrene-linseed oil copolymer

Fig. 3—No. 200 Fenske modified Ostwald viscosimeter for measuring viscosity of styrene-linseed oil copolymer

pores of the material throughout the section thickness. Two varieties of this procedure are generally used, one for small quantity work, and one for continuous, large-scale production work. Both varieties will be fully described and discussed here. First, however, it might be well to describe and discuss the various types of sealing compounds.

Many different sealing compounds are used and each has its advantages and disadvantages. In many cases, selection is a matter of personal preference and choice. Some of the more common sealing compounds are listed in Table I, from which it can be seen that they include both organic and inorganic materials.

There are several requirements which any sealing compound must meet, as follows:

1. It must have good sealing efficiency, in order to seal up even fine porosity, but it must not seal up (and therefore cover up) large foundry defects such as blowholes, cracks, gas pockets, etc. In order to have high sealing efficiency, it must adhere well to the metal, must have low volatility, and must have a low shrinkage coefficient so that is does not contract on drying and reopen the pores.
2. It must be easy to handle, must be nontoxic, and must present no hazards to the operators.
3. It must be stable and not tend to spoil while in storage.
4. It must be inert when cured, must resist attack by chemicals, hot oil, steam, and water, and must be noncorrosive.

Most sealing compounds function on the same general principle. The sealant is forced into the pores of the casting and then cured, generally by a low temperature baking operation. Curing permits the sealant to fill up and seal up the pores, thus making it possible for the casting to pass pressure test.

Solutions of phenolic resins have been used to seal porous castings of iron, brass and bronze. However, a volatile solvent is used with these resins which tends to vaporize on curing at 170-270 F, leaving some porosity behind.

Sodium silicate (water glass) is used widely for aluminum castings, and to some extent for magnesium castings. However, its sealing efficiency is low when very fine porosity is encountered.

Prior to the war, tung oil was the most popular sealant for magnesium castings, and most users considered it to be extremely satisfactory. The only objection to its use was the fact that it had to be heated to about 180-200 F in order to become of low enough viscosity to be forced into the pores of the castings, and the storage tanks had to be provided with heating coils, in order to keep the tung oil warm and thus prevent setting in the tank.

When the war started and tung oil could no longer be obtained from China, it became necessary to develop new sealants for magnesium alloy castings. Several sealants were finally produced which are now considered to be as good or better than tung oil. Most of them are copolymers of styrene, which is also used in the production of synthetic rubber.

TABLE I—Impregnating Compounds Used For Sealing Porous Castings

Impregnating Compound	Manufacturer
1. Tung Oil (see specification AMS-2560-A)	
2. Water Glass (Sodium Silicate)	
3. Castor Oil	
4. Creosote Oils	
5. Zinc Chloride	
6. Carbon Tetra-chloride	
7. Solutions of Phenolic Resins	
8. Styrene-Linseed Oil Copolymer (Armetol)	Dow Chemical Co. (Archer-Daniels-Midland Co.)
9. Liquid Resin No. 7347A	Durez Plastics & Chemicals Inc.
10. Solutions BE-2106 and BV-1845	Balekite Corp.
11. Synthetic Resin—Styrene Copolymer	Monsanto Chemical Corp.
12. Compound No. 988	Ault & Wiborg Co.

Aside from tung oil, the sealant with which the author has had the most experience, and which he has found to be very satisfactory, is one which was developed by the Dow Chemical Co. This material is a copolymer of styrene and linseed oil, and has the following chemical composition:

Monomeric styrene	78.8% by volume
Linseed oil (Z-6)	20.0%
Benzoyl peroxide or tertiary butyl hydroxide	1.0%
Guaiacol	0.2%

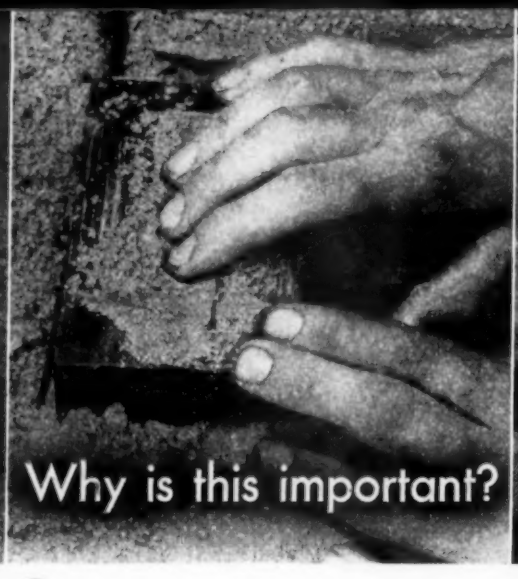
The peroxide is used as a catalyst in curing, and does present some hazards in handling. In addition, the components must be mixed before using. In order to eliminate these disadvantages this material is now manufactured by the Archer-Daniels Midland Co., Minneapolis, as a prepared mixture called Armetol. The styrene and linseed oil can be purchased already mixed in 55-gal drums. The balance of the chemicals are added in 1-gal quantities in the storage tank as a catalyst concentrate.

Last month the author discussed methods of reducing microporosity in magnesium castings. Here he describes how castings requiring pressure tightness can be impregnated so as to seal up what porosity may still exist.

After being impregnated with this solution, the castings are cured by baking at about 275 F. Baking actually copolymerizes the styrene and linseed oil into a solid rubberlike compound within the pores of the casting, and effectively seals all the pores against leakage. Ordinarily this material polymerizes slowly even at fairly low temperatures, and it is therefore necessary to keep the storage tanks cooled to below 70 F. This material has the advantage that impregnation can be done at room temperature rather than at 200 F as in the case of tung oil.

In spite of its effectiveness in sealing even tiny porosity, the author has found that impregnation with this material will not cover up foundry defects. Blowholes, gas porosity and similar defects will not be sealed up, and will continue to leak on pressure test after impregnation.

As mentioned previously, two methods are in common use for impregnating (*Please turn to page* 224)

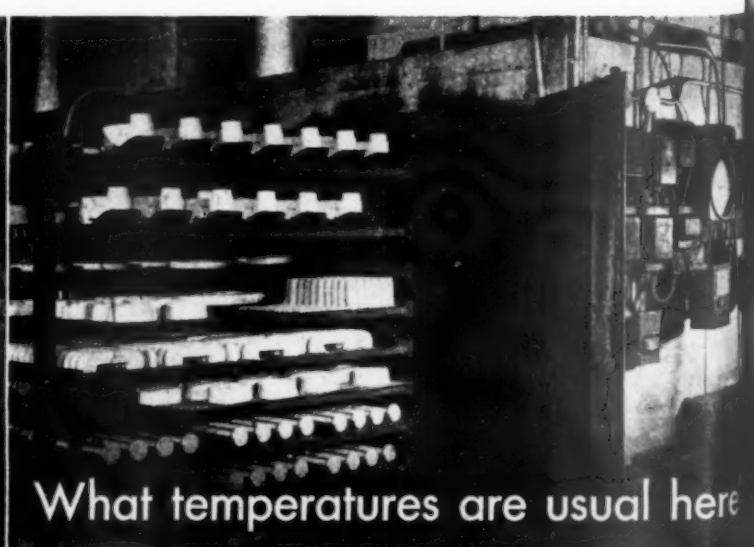


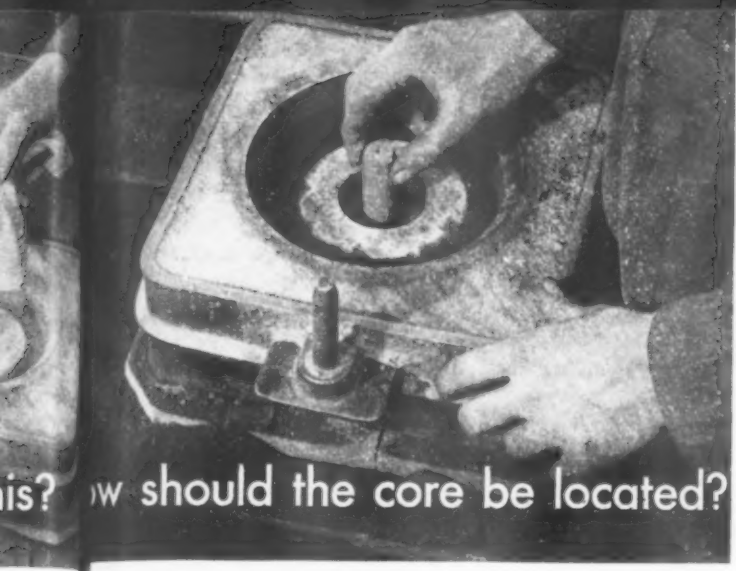
By SEERLEY REID

Motion Pictures

Shown here are selected views from the silent filmstrips which accompany the various motion pictures and which are used to review important features of the different operations. They also are useful in providing additional information which could not be included in the motion pictures

FOUNDRY





TO TEACH

WORK

As an aid to teaching the essentials of foundry work, the United States Office of Education has available for use by industry a series of 14 sound motion pictures which were prepared and checked by technical experts.

THE essentials of foundry work—from the simple job of cutting a sprue to the complex steps in operating a cupola—are demonstrated in a series of 14 sound motion pictures produced by the United States Office of Education and now available to vocational schools and industrial plants throughout the country.

Each of the films deals with a specific operation—such as "Making a Simple Core" and "Molding with a Gated Pattern"—and follows that job from start to finish. The former picture, for example, opens with a definition of cores and an explanation of their uses in castings, discusses briefly the characteristics and preparation of core sand, then shows in detail the steps in making a one-piece core and a two-part core, in drying the cores, assembling the two-part core, and placing the core in the mold.

Similarly, each of the other 13 films shows a typical foundry job, step by step, from beginning to completion. Five of the pictures deal with bench molding, five with floor molding, two with machine molding, and two with melting practice. Titles and descriptions of the individual films are given at the conclusion of this article.

Produced for Wartime Training

The Office of Education foundry films were produced as part of its war training program, but fortunately they were planned to be just as useful in vocational and industrial training in peacetime. The Office of Education, which produced 467 war training films, reasoned that basic skills in basic industries were the same in war as in peace—that the castings of a Sherman tank engine block were made in the same way as the castings of the engine block for a 4-ton truck. With this reasoning, they produced straightforward factual films with no reference to the war. Result: The films are as good today as they were before V-J Day. And probably they will still be good five years from now.

One of the unique characteristics of these films is the *operator's point of view*. They show how to do a job, not merely how a job is done . . . the worker's viewpoint instead of the onlooker's. This is not pedagogical double-talk but simple common sense. Have you ever tried to tie someone else's necktie? And had to stand behind him and wrap your arms around his neck? You can tie your own blindfolded but reversing position completely upsets you. Or have you ever seen mirror writing—quite common among small children—which is simply writing the way a child *sees* a printed page upside down. The same thing happens in movies. When the camera faces the worker, the audience sees what he does *backwards*. When the camera is behind the worker in the film, the audience sees what is being done *through the eyes of the worker*.

This is even more important in view of the psychological characteristics of a motion pic- (*Please turn to page* 200)

STRESS CORROSION of Austenitic Cast Irons

This article, detailing some stress corrosion studies conducted by the authors on austenitic cast irons, was presented before a sectional meeting of the American Society of Mechanical Engineers at Cincinnati

By JOHN B. URBAN, JOHN W. BOLTON and AUSTEN J. SMITH
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Lunkenheimer Co., Cincinnati

PROBLEMS of stress corrosion have concerned engineers for many years. "Season cracking" in brasses and embrittlement of ductile boiler plate steel in presence of alkaline media are familiar examples. A material may possess apparently adequate strength and adequate corrosion resistance, as ascertained by separate conventional tests. Yet some materials are known to fail quite prematurely when they are exposed to certain combinations of these factors.

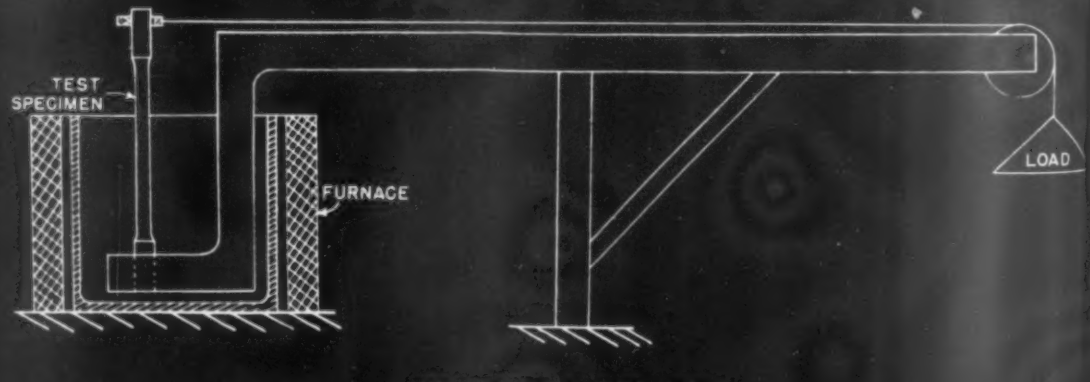
It is known that tri-axiality of stresses may bring about acceleration of failure, or failure at lower loading than would be expected from conventional formulas for mono- and bi-axial loading. Somewhat similarly, "corrosive stress" may be considered as an additional stress imposed on a normally loaded system, giving the effect of higher stress order than contemplated by formulas. The safest approach to stress corrosion problems is experimentation on various mechanical loadings under corrosive conditions. When corrosive conditions are held constant in respect to concentration and temperature, useful threshold stresses if existent can be ascertained and suitable safety factors adopted to provide suitable service life.

Since stress corrosion is initiated as a surface effect, it is essential that surface stress intensities—as imposed by loading—be determined accurately, so that the result of imposition of a corrosive condition can be evaluated. The resistance wire (S-R) type strain gage has proved quite useful in this respect.

Strong hot caustic (sodium hydroxide) is a powerful corrosive toward many metals, and produces embrittlement in some. Suitable grades of gray cast iron have fairly good resistance toward the corrosive effect and also are relatively free from stress corrosion deterioration. Some of the high nickel austenitic cast irons have excellent corrosion resistance toward strong caustics, even at elevated temperatures. This suggests their consideration where contamination of caustic must be held to a minimum and where maximum life under such corrosive conditions is desired.

The present investigation indicates that at very high stresses the austenitic cast irons are subject to stress corrosion in strong hot caustic. However, threshold stresses have been found to be relatively high, markedly exceeding stresses contemplated in design and application. Thus the desirable properties of such material can be utilized to good advantage, with margin to assure adequate safety in this corrosive medium.

Austenitic cast irons also are resistant to many other corrosive agents, both alkaline and acid, wherein long experience has shown that stress-corrosion is not a factor.



CANTILEVER BEAM TYPE LOADING

Experimental Procedures—Compositions of the materials examined are given in Table I. Samples of austenitic type cast iron were immersed in 50 per cent caustic solutions and boiled, using reflux condenser, for periods up to six months. These were broken in impact test. The test results were equal to those of companion samples not exposed to caustic. This showed that caustic embrittlement does not result when stress is absent.

Other samples were loaded under standard creep test conditions (ASTM—E 22-41 Recommended Practice for Conducting Long Time High Temperature Tension Tests of Metallic Materials.) These tests showed that the materials involved withstand stresses to 15,000 psi at 350 F without measurable flow or "creep." After removal from creep test and breaking, no differences in strength and ductility from companion unstressed samples were observed. These and other tests indicate that even at relatively high stresses the material is not adversely affected by mechanical loadings, even at temperatures appreciably above 350F. The question then is whether the combined actions of stress and exposure to the corrosive medium produce effects not indicated by these factors operating independently.

The corrosive medium and condition chosen was 50 per cent by weight commercial sodium hydroxide (aqueous solution) at 280F. Three methods of stress application utilized were tensile loading, cantilever loading and beam loading. All specimens were cast in green sand and tested in the unmachined condition to simulate the surface conditions of cast product as commonly used.

Tensile Loading Method—The arrangement of equipment is shown in Fig. 5. The test specimen was mounted between high nickel alloy pulling bars supported at the top with a ball and socket joint and a dead load applied to the bottom. The bottom bar passed through the base of a high nickel alloy container with a water-tight seal, the container being filled with solution of commercial sodium hydroxide. A heating element around the container maintained the desired temperature of 280F through a potentiometer controller and thermocouple. This temperature is very near the boiling point. Water lost through evaporation was replaced continuously through a simple gravity feed mechanism holding the solution concentration relatively constant. The average stress intensity over the affected area was established by the sum of the weights of container and

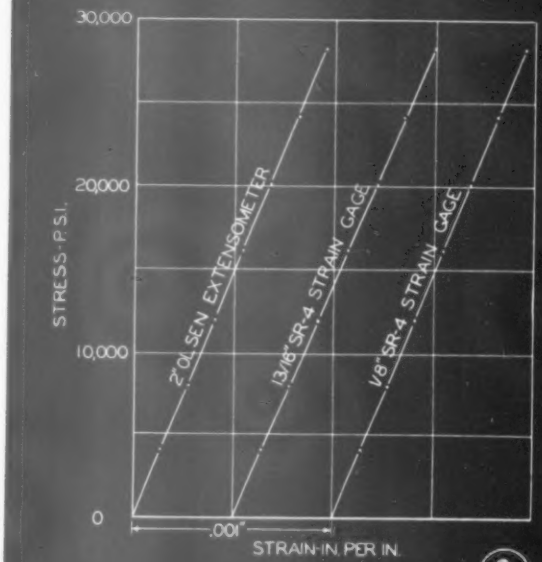
Fig. 1—Cantilever beam type loading in stress corrosion tests

Fig. 2—Simple beam type loading

Fig. 3—Chart of strains and applied load obtained in checking accuracy and sensitivity of SR-4 strain gages

Fig. 4—Typical tensile stress-strain curve for austenitic cast iron

Fig. 5—Stress-corrosion test setup for tensile loading



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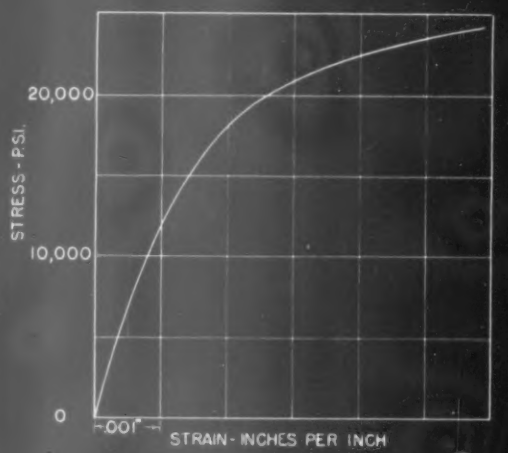

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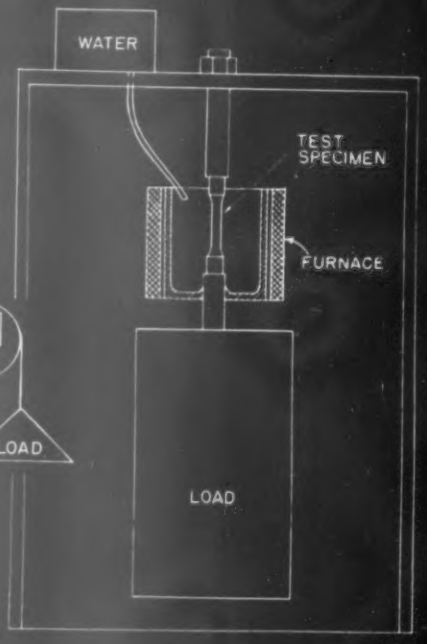

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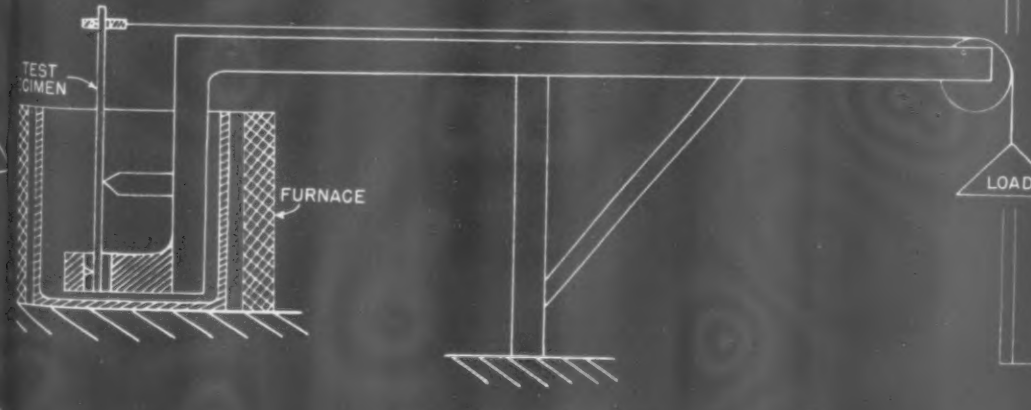

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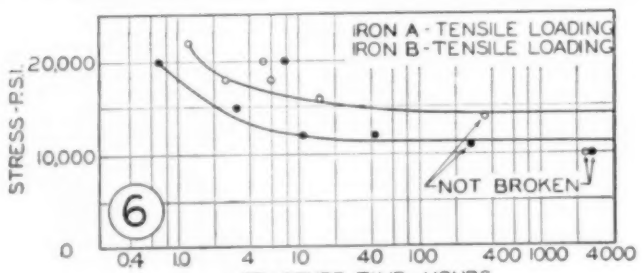
TABLE I—Compositions of Materials Examined

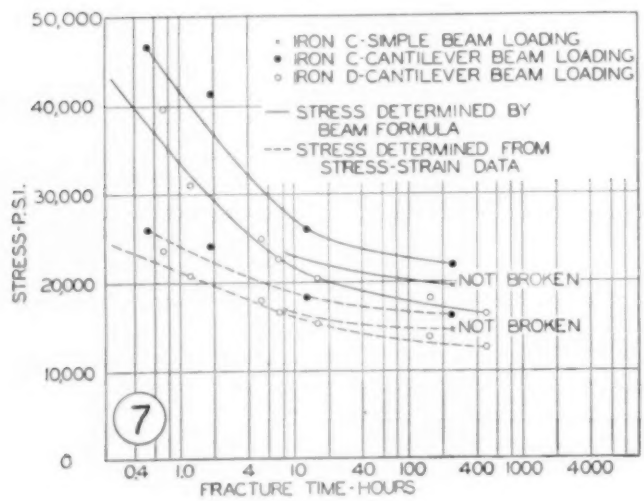
	Austenitic Cast Iron A	Austenitic Cast Iron B	Austenitic Cast Iron C	Austenitic Cast Iron D	No. 25 Cast Iron
Carbon	2.44	2.10	2.66	2.75	3.25
Graphite	1.98	2.01	....	....	....
Silicon	1.84	1.77	1.88	1.97	2.75
Manganese	0.90	0.74	.92	.98	0.58
Phosphorus	0.050	0.049	.14	.13	0.33
Sulphur	0.020	0.015	.028	.025	0.055
Nickel	19.82	20.61	19.86	19.09	....
Chromium	1.60	....	1.65	1.75	....
Molybdenum	0 74	0.90	.63	.62	....
Copper	4.10	0.06	4.55	4.33	....

TABLE II—Time for Fracture—Hours

Tensile Stress, psi	Austenitic Cast Iron A	Austenitic Cast Iron B	No. 25 Cast Iron
25,000	.....	.....	284*
22,000	.....	1.25	.....
20,000	.7 & 7.7	5.2	.....
18,000	.....	2.5 & 6	.....
16,000	.....	15	.....
15,000	3.1	350*	.....
12,000	11 & 43	.....	.....
11,000	270*	.....	.....
10,000	2,600*	2,600*	2,600*

* Not broken.





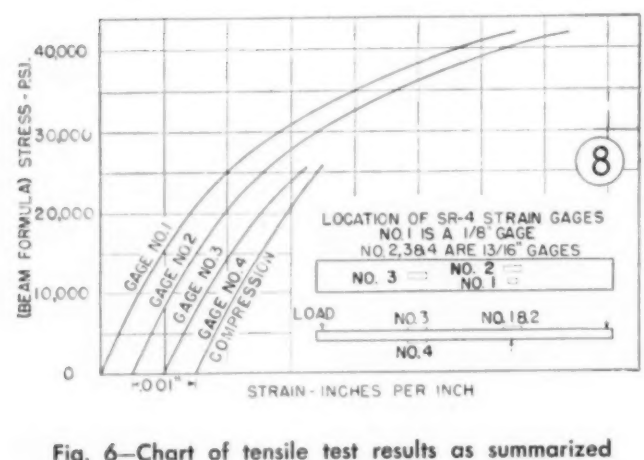


Fig. 6—Chart of tensile test results as summarized in Table II

Fig. 7—Results from beam loadings of specimens as recorded in Table III

Fig. 8—Showing method of mounting strain gages and stress-strain curves obtained for austenitic cast iron

TABLE III—Fracture Time—Hours

Stress from Beam Formula	Stress from Stress Strain Curve	Austenitic Cast Iron C Simple Beam	Austenitic Cast Iron C Cantilever Beam	Austenitic Cast Iron D Cantilever Beam
49,200	26,300	...	...	0.1
46,800	26,000	...	0.5	...
41,400	24,200	...	1.8	...
39,600	23,700	...	...	0.7
31,100	20,800	...	...	1.2
25,800	18,400	...	12.4	...
24,900	18,000	...	...	5.0
23,200	17,000	8.1	...	...
22,600	16,700	...	...	7.1
22,000	16,400	...	236	...
20,400	15,400	...	...	15.5
19,650	14,800	243*	...	...
18,200	13,900	...	...	152
16,370	12,600	...	...	468

* Not broken.

contents, lower pulling bar, and applied weights

Beam Loading Methods—These systems are shown in Figs. 1 and 2. The ends of the test specimens were attached to the load through a wire passing over a ball bearing mounted pulley of very low frictional resistance. By means of this arrangement, stresses on the specimens were independent of flexural changes in the supports, within reasonable limits of flexure of specimens. Tests were carried out both on round specimens 0.5 in. diam, and specimens of rectangualr cross section measuring 1 x 0.4 in. Specimens were 8½ in. in length in the cantilever test; in the simple beam tests the outer knife edges were 9½ in. apart, the center knife edge 3½ in. from the lower fixed edge.

In conventional engineering practice stress intensities (as rupture moduli) usually are calculated by the beam formulas. These formulas are based upon the assumptions of elasticity and equivalent stress-strain moduli in both tension and compression. Cast irons do not comply with these assumptions. As shown by this firm ("Mechanism of Deformation in Cast Iron," — *Proceedings*, ASTM — 1932) and others, the stress strain curve of cast irons combines both elastic and plastic components. Also, properties are not equivalent in tension and compression. Thus the neutral stress axis does not coincide with the geometric axis.

Since stress-corrosion phenomena—at least at their incidence—are influenced by surface conditions, accurate measurement of fiber stress is necessary for evaluation. Strain-resistance (S-R) gages are quite useful for this purpose. S-R gages and instrumentation have been described in detail in recent literature. Many applications have been made to elastic materials. In such applications the measured strain is interpreted in terms of stress by introduction of Young's modulus.

Since the materials studied by us are but quasi-elastic, a modified procedure was (*Please turn to page* 182)

GRAY IRON

in War and Other National Emergencies

By W. W. ROSE
Washington

THE shooting part of World War II is over, but the evolution following thereon is still in a state of flux and leading to who knows where. While every American in all walks of life wishes to the bottom of his soul that this may be the last war he may see and that wise statesmanship may lead us into the paths of peace without violent upheaval in our economic system or even another war, one has but to read the daily press and note the bitter controversies that have arisen in both our foreign and domestic policies to feel the grave potentialities of the hour.

The gray iron foundry industry, being one of the oldest crafts known to mankind, has survived many wars, many crises. But in tracing back its history it would appear that it has failed in each instance to examine carefully its shortcomings, draw from each a lesson and take steps to provide remedies so that on future occasions its general staff will merely have to draw the plans from the proper drawer and act on them.

There are reasons for this action, or lack of it. The most recent crises, which are fresh in the minds of most of the members of the industry, are the great depression following World War I, culminating in the National Recovery Administration and World War II from which we are now readjusting ourselves. The NRA, for which we were totally unprepared, left such a bitter taste in the mouths of most operators that their only reaction was to try to forget it and return to their own rugged individualism as quickly as possible. Even today there are foundrymen who will not forget and still refrain from any support to their national trade association which is, in truth, their only hope in preventing or handling a like situation, should such arise as a result of the recent war.

Fortunately this bitterness is lacking in the experience of World War II since, in spite of lack of co-operation on the part of more than half of the industry, the trade association was able to do a fairly good job in protecting the members of the industry from disastrous mishaps which might well have befallen them. It is the purpose of this article to examine these threats, the means taken to circumvent them, and what may now be done to prevent their recurrence.

This may prove difficult because, while dissension between members of the industry resulting from NRA is lacking, the myriads of reports and forms required by government during the war have built up an antipathy to questionnaires without which it will be impossible to construct an economic history so necessary to protect us in the years to come. All of the information gained by the government is lost because the bureaus which expected it are gradually going out of business and this priceless material is either being destroyed or made inaccessible to the public in the files of the Bureau of the Archives. Much of it was confidential so the government has good grounds for its suppression. It remains to be seen whether the industry will be sufficiently foresighted again to yield this information to its trade association where it can be worked over and put in shape for future legitimate use. Only time will tell.

When the writer first contacted the gray iron foundry industry some 12 years ago he shared the general public's knowledge, or rather ignorance, of the scope of gray iron application and its basic importance in the industrial world. He knew that old type mail boxes, lamp posts, manhole covers, fire plugs and some parts of farm machinery were made of "cast iron." But he would have considered fantastic the fact, later discovered in the War Production Board, that except for the products of the rolling mills and steel foundries, more gray iron castings were used than the sum total of all other materials of engineering. Even the members of the gray iron industry itself were unaware of this.

Such, unfortunately, was the general impression throughout the business and professional world, so that we entered upon a global war with the butchers, bakers and candlestick makers—who go to make up the John Q. Publics who form the draft boards and other bureaucratic paraphernalia necessary in global wars—giving little or no thought to the huge but sprawling basic industry.

This situation can probably be classed as our major underlying fallacy, for to it can be (*Please turn to page* 170)

Malleable Founders

STUDY INDUSTRY PROBLEMS

By FRANK G. STEINEBACH
Editor
THE FOUNDRY

GENERAL industry meeting of the Malleable Founders' Society held at Haddon Hall, Atlantic City, N. J., Sept. 20, was devoted to the study of problems created through governmental regulations, and to reports of the various committees of the organization. An excellent attendance provided a high representation of companies in the malleable iron industry.

With representatives present from the Civilian Production Administration and the Office of Price Administration, the morning session considered specific problems relating to price control, and to the outlook for improvement in the supply of pig iron, scrap and coke in the face of restrictive regulations promulgated by the Housing Administration.

Frank E. Shumann, Lehigh Foundries, Inc., Easton, Pa., and president of the society, presided.

Brinton Welser, Chain Belt Co., Milwaukee, and chairman of the Committee on Government Relations, explained that the committee had been set up to aid the malleable industry by keeping in complete touch with situations in government agencies, and by presenting facts on the industry before irretractable orders had been issued.

He stated that "we will support every government rule that will accomplish economic good, but we should frankly and aggressively seek changes when changes benefit us. In doing this we cannot seek benefits which will injure the national economy. When attempting to define where our interests and the public's interests separate, certainly because of the essential nature of our output, the public's interests will not be served if, through government edict, our production and accompanying employment is thwarted in spite of fair, efficient and hard-working management."

Mr. Welser indicated that among the governmental departments and subjects in which the committee can properly interest itself in supplementing the work of the Government Advisory Committees and the standing committees of the society, insofar as they relate to legislation and regulations, are:

CPA—So that we, as producers of essentials can procure in free markets our required raw materials and supplies.

OPA—So that we may develop reasonable earnings which are necessary if we are to stay in business and continue as employers of labor; and so that we may be helpful in avoiding inflationary prices through the simplification of controls. The gyrations of real prices in commodities and capital share values have shown that controls have done little to stabilize prices.

Manpower and Labor—So that we may have sustained and stabilized production and employment, support programs that will get the maximum numbers of workers back to work, and to protect public interest by supporting programs that will correct coercion of the public by groups of the public, whose group statutory rights were intended to be restricted to group monopolies and not extended to general or public monopolies. Furthermore, we should energetically support all programs that will help eliminate disruption for disruption's sake, which strikes at the very core of good management and directly at the heart of labor's interests.

Government Agency Procedures—So that these procedures may be simplified, thus lowering the cost of government and helping to increase industrial and agricultural production, all of which should result in better individually controlled costs of production and less dangerous inflation.

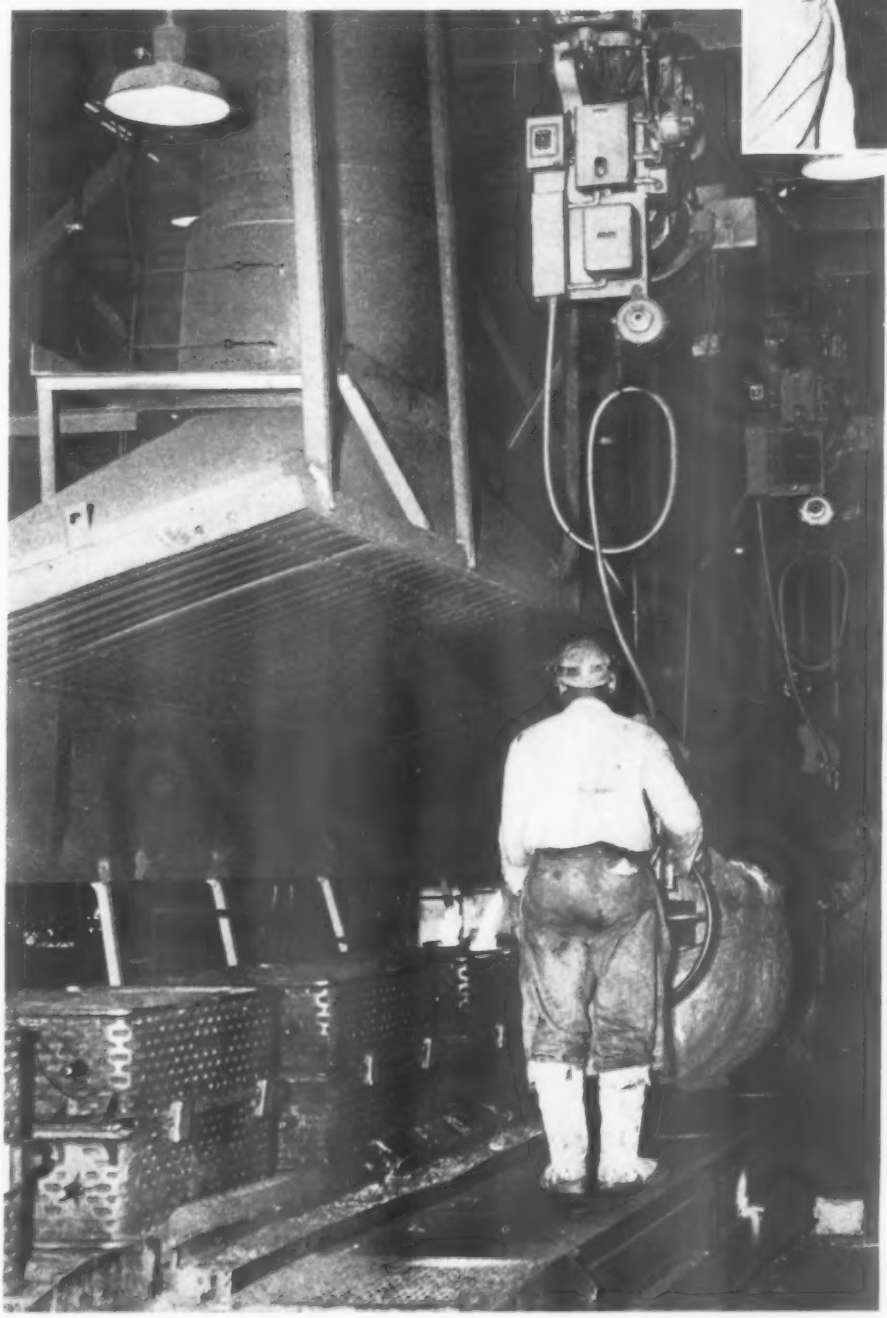
Surplus Disposal—So that the large surpluses now hanging over the market be dislodged from government trusteeship and placed in useful circulation while the present shortages still exist, and thus avoid adding to the many disturbing influences we are sure to encounter when demands drop off.

Exports and Imports—So that there will be a steady flow of products between countries with a fair degree of give and take which will be helpful to all of them. This involves limiting export contributions to the ability to give, and involves as well as fair pricing and/or duty, regulations for both exporting and importing.

Taxes and Government Spending—So that equitable proportions of the tax load may be established, through limiting government spending to strictly economic projects as we realize that all political spending is a direct contribu- (*Please turn to page* 222)

Simplifies

CYLINDER BLOCK POURING



IN AN effort to remove dust, heat and manual effort from the cylinder block pouring operation at the Buick Motor Division, Detroit, a motor-driven ladle has been installed in connection with the pouring platform and an efficient exhaust system.

The equipment is believed to be the first of its kind installed in a production gray iron foundry and represents another step in a concerted drive to improve working conditions in the foundry. The arrangement was devised by W. G. Mixer, foundry superintendent, and his engineering staff. The ladle carries 1800 lb of iron and is handled easily by one man through pushbutton controls and a hand wheel, replacing the crew of five which formerly was required at this station.

Questions and Answers

Blows Make Defective Casting

Q.—We are sending for your examination a small flanged casting with which we are having trouble due to small holes at the junction of flange and body. Casting is one of four on a matchplate made on the bench in a 14-in. square flask with a 5-in. cope and 5-in. drag. Metal poured into the castings contains 2.32 per cent Si, 0.069 per cent S, 0.65 per cent P, 0.81 per cent Mn, and 3.28 per cent TC. Can you suggest a remedy for the defect?

A.—The casting, which consists of a cored boss or body about 2 in. in diameter and 1¼ in. high containing a 1-in. hole, and a flange 4-in. in diameter and ¾-in. thick, contains as you indicate a few small holes at the junction of flange and body. Fracture at one of those points shows a slightly larger cavity which is rough and discolored such as caused by steam or moisture. The trouble is located at a re-entrant angle where the moisture or steam is driven normally or perpendicularly from the mold faces. Those two streams meet at some point and unless they have a free exit they tend to strike back diagonally toward the casting.

That direction would be to the junction of flange and body of the casting, resulting in the blow defect which is shown. It is one matter to point out what the defect is and how it is caused, but something else to state how it happened. On that score we can only surmise. It might be caused by the molder using the swab too freely when patching a broken edge. It might be caused by sand or clay balls or possibly by the presence of iron shot or tramp iron in the molding sand. Another possibility is ramming or peining the sand too hard at the point in question.

Spray Coat on Permanent Mold

Q.—In a recent article in THE FOUNDRY on permanent molds for casting aluminum alloys mention is made of a spray coating that is employed for the mold cavities, and a special spray for the downgate, sprue and riser. We are doing some experimenting with that method of casting, and would like to know a little more about these sprays as to ingredients, etc.

A.—A number of proprietary mold sprays are available, some of them the type referred to in the article. Such sprays or mold coatings may be composed of French chalk, china clay, whiting, talc, asbestos, mica, fireclay, rouge, graphite alone or in combination. They are mixed with water with a small amount of sodium silicate (water glass) as a suspensory agent. Usually the coating or spray used on the downgate, sprue and runner system contains more asbestos to provide higher insulating value to keep the metal molten for a longer period—and also the system is given a heavier coat of material. Mold coatings or sprays may be obtained from a number of firms whose names and addresses appear in the advertising pages of THE FOUNDRY.

Coating Spoils Appearance

Q.—We have been experiencing a whitish coating or accumulation on our red brass plumbing castings as evidenced in the sill cock submitted for examination. Our castings are blasted with steel shot in a tumbling type machine, then machined and assembled. Following that they are tested under water for possible leaks and defects. After that operation the whitish coating appears which gives a rather moldy, unsatisfactory appearance. Can you tell us what the whitish coating is, and how it may be avoided?

A.—Since we do not have facilities for performing analytical analyses, we cannot tell definitely what the white coating or incrustation is. However, we suspect that it is caused by the cutting compound used in the various machining operations, and which is allowed to dry on the castings. It can be removed by application of a rag and plenty of elbow grease which indicates that it is only a surface condition.

We believe that the condition can be remedied by seeing that the cutting compound is removed thoroughly directly after the machining operations. Perhaps a good rinsing in cold followed by hot water might do the trick, although some type of detergent or cleaning compound might be required previous to rinsing. However, your present lot containing the discoloration probably will have to be given acid dip to bring them back to the normal color.

Production of Silicon Bronze

Q.—Will you please send us all the information you have on silicon bronze which is replacing all alloys containing high tin contents? We would like to know how to melt it and cast it. Also we would like some information on working of 195 aluminum alloy.

A.—Your request for all the available information on silicon bronze is rather a large order, and we can provide only a brief reply. There are a number of silicon bronzes and brasses on the market which vary to some extent in composition. Essentially they contain over 90 per cent copper with varying amounts of silicon, manganese, iron and zinc. Melting of these alloys can be accomplished in the usual units employed in brass and bronze foundries, and since you operate a small foundry probably use crucible furnaces. Those will be quite satisfactory. Silicon bronze usually is melted under a glass cover, and the procedure will depend upon the particular composition, since some alloys are available in ingot form and others as a hardener which is added to copper. Details on method may be obtained from the supplier of the silicon bronze.

Silicon bronzes are poured from 1900 to 2250 F depending on the section thickness and intricacy of the cast-

ing. Sand for molding should be open, and the cores such that they collapse reasonably easily. Shrinkage of the alloys is about halfway between gun metal and manganese bronze. Large risers are necessary to give sufficient feeding. A number of articles have appeared on silicon bronzes and include: "Producing Silicon Bronze Castings" by J. E. Crown, August, 1942, issue of THE FOUNDRY; "Casting Silicon Bronze Alloys," September, 1942 issue; "Producing Copper-Zinc-Silicon Bronze Castings" by R. J. Keeley, April and May, 1944 issues; "Sand Castings of Copper-Silicon Alloys" by Bedworth and Weaver, *Transactions* AFA, 1936; "Copper-Silicon-Iron Bronze" by Roast and Jennings, *Transactions* AFA, 1941.

The No. 195 aluminum alloy you mention is one containing about 4 per cent copper, remainder aluminum for sand casting, and with the addition of about 3 per cent silicon is used for permanent mold castings. So far as we know it is handled similarly to other aluminum alloys, but its casting or pouring qualities are not as good as the 5 per cent silicon alloy or the 8 per cent copper alloy. However, to attain the best physical properties the No. 195 alloy must be heat treated. Details on the various heat treatments to obtain various physical properties should be obtained from the alloy supplier.

Castings Leak Under Pressure

Q.—We are forwarding for your attention four small gray iron castings, each 4 in. square, and molded four in a flask on a squeezer machine. Although they present a clean surface, a great many of these castings leak when tested under 60-lb air pressure. We shall appreciate your opinion on the cause and the remedy.

A.—A casting apparently solid, but which leaks under test, is in the border line class. The trouble may be caused by a single factor, or by a combination of several factors. The sand may be a little too wet, or may contain excessive bond. The first results in the development of an extra amount of steam. The second will prevent the steam from escaping readily. The trouble is further aggravated by a tight bottom board.

In this particular case the castings and gates occupy practically all the space at the joint line between cope and drag. Consequently, the only direction in which the steam can escape is downward. Even where the sand is sufficiently permeable, the steam cannot escape readily if the bottom board is jammed in hard. The first and most obvious remedy is to provide bottom boards with numerous perforations. Alternatively, vent passages might be scratched in the surface of the sand in contact with the bottom board. This would be satisfactory for a small number, but would constitute an extra and time wasting gesture where the castings are made in great numbers.

Where the steam cannot escape readily, a certain amount seeps into the mold cavity and causes the metal to flutter. In a large, heavy casting, the fluttering may die down before the mold is filled. No evidence remains. In a comparatively thin casting where the metal solidifies rapidly, some of the steam may be trapped to form either distinct blowholes or a microscopic segregation that promotes leakage under pressure. Method of pouring may be responsible. The last metal should be poured slowly. The foundry term is *touching 'er up*. This gives the metal a chance to settle if a slight flutter is in existence. Incidentally, your present metal is too coarse and open grain for pressure tight castings. Addition of 10 or 15 per cent steel to the charge will reduce the silicon and total carbon.

Describes Use of Wood Flour

Q.—Recently we heard a reference to wood flour being used as a binder in molding sand, but that did not seem quite right to us since we do not believe it possesses that characteristic. Can you give us any information?

A.—While we know that wood flour is being used to some extent in the steel foundry, it is our understanding that the application is to promote collapsibility and not as a binder. For more expert opinion on the matter we consulted Earl E. Woodliff, Foundry Sand Engineering Co., Detroit, who has done considerable work on the use of wood flour, and his remarks follow:

"Substitution of wood flour for cereal binder in steel foundry sands has merit. My experience leads to the belief that wood flour is used best as an extender of cereal flour, thus making only a part replacement of the cereal by an equal weight of wood flour in such sand mixtures as steel facing sands. When this practice is used and the replacement is one-third or greater of the cereal, it has been found necessary to increase the additions of bentonite or bonds. This is in order to maintain the established physical properties.

"While some believe that wood flour is a binder for sand, in reality it is not, but is a cellulose filler. Wood flour addition to foundry sand brings about a more rapid collapsibility of the sand during solidification of the cast-

GANGWAY!

By J. A. Patterson

"Me? Naw, I been paid already—I'm waitin' for my friend, Gus."

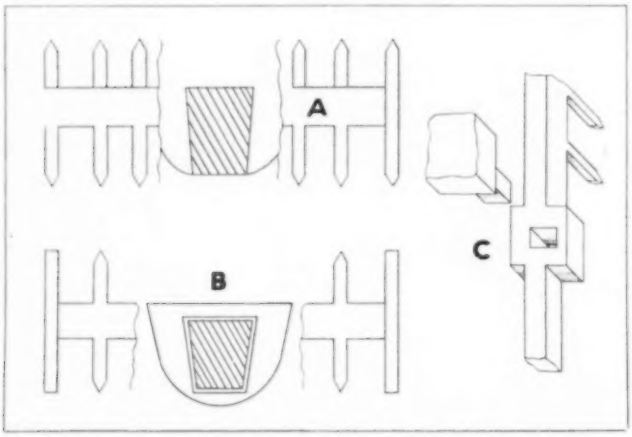
ing—allowing normal shrinkage. It is therefore possible, by adjusting the wood flour content of a core or facing sand, to control the sand collapsibility, reduce hot strains and casting cracks that are due to sand conditions.

"Second important advantage of wood flour in foundry molding sand is its ability to reduce thermal expansion of the rammed mold face. This, in terms of the everyday foundry explanation, means control or elimination of sand buckles, rat tails and scabs. This usually can be accomplished with a very small percentage of wood flour, less in most cases than by any other organic binder. Third advantage in using wood flour, although it is seldom used for this specific purpose, is the extra smoothness and flowability which it imparts to the sand. There are a number of steel foundries which have been able to extend the use of return black sand for coremaking since the introduction of wood flour. It has given a smoother surface with good workability and shakeout properties."

Simple Arbors in Green Cores

Q.—We were interested in an article, "Mechanized Casting of Soil Pipe and Fittings," in the June issue of THE FOUNDRY. We shall greatly appreciate the following additional information on certain items in connection with the green sand cores in the miscellaneous fittings and in the straight lengths: 1. In the *B*-method, page 246, of booking the cores for fittings, a—Can you indicate the usual cross section shape of the cast iron arbors? b—Is the statement correct that there is no arbor in the cope half of the core? c—In a plan view do the arbors correspond to the shape of the fitting? For example is the arbor Y-shape for a Y fitting, etc.? d—Are the arbors expendable in the manner of chaplets, nails, etc.? If not, how and when are they salvaged each time they are used? e—When sweeping green sand cores for standard 2 and 4-in., straight sections, what is the approximate speed, the rpm, of the arbor? f—Could cast iron arbors be expected to work moderately well instead of steel tubes?

A.—A complete answer to the list of questions would run to several pages, with an additional page of illustrations showing some of the shapes. The following brief reference possibly may serve your present purpose: a—A fairly typical shape is a rectangular back bone or central member with a row of short projecting members on each side. On large arbors and on shapes that cannot be removed from the casting readily, the wings are provided with open ings and are held in place with wood wedges on the ce tral member. In other instances, for example on a y, t arbor is in two parts, locked in the center with one of many varieties of mortise and tenon joints. b—Yes. There is no arbor in the cope half! c—Yes. The arbor corresponds loosely to the shape of the casting. d—Arbors occasionally are broken deliberately or accidentally, but usually are salvaged at the shakeout. e—Originally, and to some extent down to the present, core barrels were and are revolved by hand at an approximate speed of 60 rpm. Mechanically driven units travel a little faster. f—Cast iron core barrels exclusively were used until quite recently. They are still used in many plants.



Freehand sketch shows typical forms of arbor construction: *A*, all one piece; *B*, loose wings wedged to back bone; *C*, joint for Y arbor

Give Slush-casting Procedure

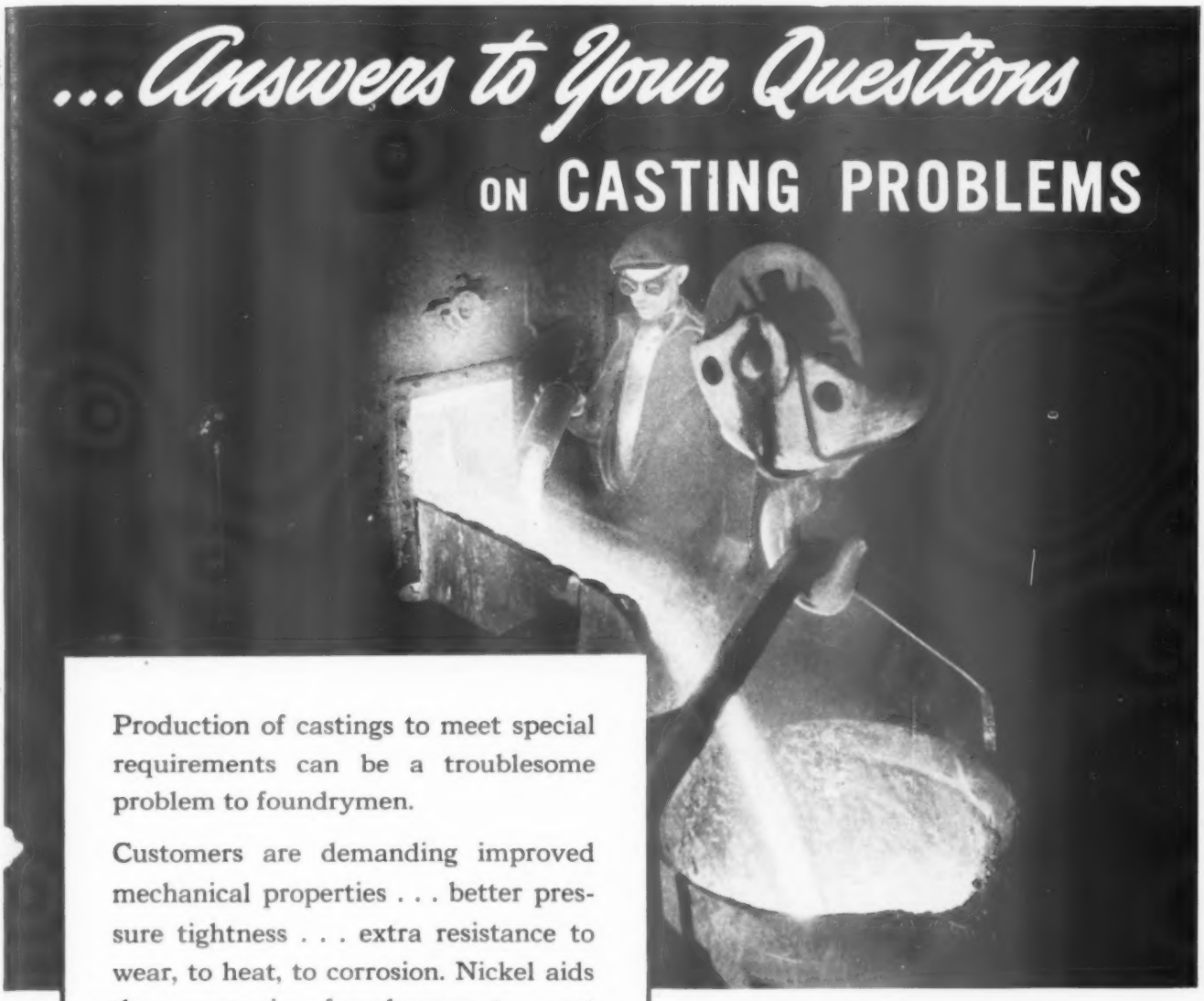
Q.—We are opening a new department in our plant where we intend to make lamp bases and ornaments by slush-casting zinc-base alloy. Can you tell us where we can obtain equipment, supplies, etc? Are there any reference books, manuals, etc. on the process?

A.—While the slush-casting process has been employed for many years, there seems to be little information available in the literature on details of the procedure It appears that the firms engaged in this work usually employ bronze molds which are made from plaster patterns—such work being performed in their own design departments. However, it is quite possible that companies engaged in producing dies or molds for die-casting operations probably could produce the desired molds.

Bronze molds are made in two or more pieces, depending upon whether undercuts necessitate drawbacks, and those are clamped together for pouring in the metal. Molds are mounted on trunnions so that they may be turned over to remove the excess metal. Generally the arrangement of equipment is the molten metal pot at the operator's right, the die or mold bench in the center and a cold water bath at the left. Molder takes a ladle of metal from the pot, pours it into the mold and waits a certain period of time for a shell of metal to form. Then he turns the mold over, allows the metal still remaining liquid to run out into the ladle, and pours it back into the molten metal pot. Length of time the metal is held in the mold is gained by experience.

The mold is unclamped, the casting removed, and the mold parts cooled in the water bath if that is required. Mold again is assembled, clamped, and the cycle of operations continued. Sometimes instead of filling the mold completely with molten metal and allowing it to stand for the desired period, the operator only partially fills the mold, and rocks it back and forth to form the shell on the adjacent parts. This is another feature of slush molding that is acquired by experience. Such practice is advantageous since less metal is required per mold, the mold does not get so hot, thus permitting more rapid formation of the metal shell, and greater production in a given period of time. Since in slush molding the excess metal is poured out after the shell of desired thickness is formed, no cores are required to produce a casting which is hollow. Alloy used for slush casting usually is a zinc-base alloy termed slush-casting alloy and it may be obtained from various supplies of zinc and its alloys.

...Answers to Your Questions ON CASTING PROBLEMS



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MEN of Industry

DAVID G. ANDERSON has been appointed acting head, engineering staff, National Foundries Association, Chicago. He has been associated with the foundry industry for 40 years, and has been chief foundry engineer at the Chicago plant of the Western Electric Co., Chicago, since 1926. Previous connections include Ohio Malleable Iron Co., Columbus, O., and Pittsburgh Engineering Co., Pittsburgh, where Mr. Anderson was general superintendent. He has contributed to the progress of the foundry industry by numerous patents which he has originated and by presentation of technical papers before engineering societies. An active member of the American Foundrymen's Association, he was president of the Chicago Foundrymen's Club, a forerunner of the Chicago Chapter of the AFA.

♦ ♦ ♦

William M. Ferguson, chairman of the Texas Chapter of the AFA for 1946-47, is sales manager, Texas Electric Steel Casting Co., Houston, Tex. Mr. Ferguson was graduated from Rice Institute in 1935 and joined Texas Electric Steel Casting Co. two years later as a chemist. He worked on electric furnaces for about six months and then was placed in charge of the chemical and metallurgical laboratory. In 1939 he was engaged in sales work but during the war went back into the plant as production manager, returning to sales work in 1945. He was made sales manager this year. Mr. Ferguson has been a member of the Texas Chapter since it was formed three years ago, and served as its vice chairman last year. He is also a member of the American Society for Metals and Steel Founders' Society of America.

♦ ♦ ♦

Harold H. Judson, national director of the American Foundrymen's Association, and until recently foundry superintendent, Goulds Pumps Inc., Seneca Falls, N. Y., has been appointed foundry superintendent, Standard Foundry Co., Worcester, Mass. Mr. Judson was graduated from Worcester Polytechnic Institute in 1923. For the following three years he was foundry engineer, Riley Stoker Co., Detroit, and in 1926 became connected with Goulds Pumps as foundry superintendent. When the Central New York Chapter was organized in 1939 Mr. Judson was elected its first chairman. He was author of the AFA exchange paper presented at the annual meeting of the Institute of British Foundrymen in 1936.

♦ ♦ ♦

Eugene W. Smith, for the past 3½ years works manager, Lindahl Foundry Division, American Gear & Mfg. Co., Chicago, is now associated with Western Materials Co., Chicago, distributor of foundry sands, aggregates, bentonites, clays and silica flour. He will represent the company in metropolitan Chicago and northern Indiana. From 1929 to 1943, Mr. Smith was president and general manager of his own company, Eugene W. Smith Inc., Evansville, Ind., supplier of foundry sands, and for six years prior to that was sales manager, Hougland & Hardy Inc., Evansville, Ind.

♦ ♦ ♦

J. E. Fifield has joined the New England technical section of the Development and Research Division, International Nickel Co. Inc., New York, with headquarters in Hartford, Conn., where he will assist **D. A. Nemser,** manager. Mr. Fifield was graduated from Massachusetts Institute of Technology in 1940 and became associated with American Manganese Steel division of the American Brake Shoe Co., New York, as plant metallurgist. He joined the Navy in 1943 and was appointed instructor of electrical engineering at the U. S. Naval Reserve Midshipmen's School in New York the following year. From November, 1944, to May, 1946, he served as assistant to the plant manager and foundry metallurgist in the Naval Research Laboratory, Washington.

♦ ♦ ♦

B. M. Loewenstein has been appointed general sales manager, Howard Foundry Co., Chicago, in charge of sales activities of its four plants which produce aluminum, brass, bronze, magnesium and semisteel castings. Mr. Loewenstein, well known in the nonferrous industry, began his foundry career with Tiffany Castings Co., St. Louis, where he was production manager for 5 years prior to World War II. During the war he was head of the casting division of the Gun Turret Plant, Emerson Electric Mfg. Co., St. Louis, later devoting some time to die casting and permanent molds. He went to Mexico recently to help organize foundries under construction there.

♦ ♦ ♦

E. D. Riordan has been appointed director of industrial relations, Lunkenheimer Co., Cincinnati. A graduate of Michigan State College, Mr. Riordan's

(*Continued on page* 100)

DAVID G. ANDERSON

WILLIAM M. FERGUSON

HAROLD H. JUDSON

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(*Continued from page* 98)

previous connections include Fisher Body and Saginaw Malleable Iron divisions of General Motors Corp. and more recently the Bell Aircraft Corp., Buffalo.

♦ ♦ ♦

Z. Madacey, elected chairman of the Central Illinois Chapter of the AFA to serve during 1946-47, is superintendent of the gray iron foundry, Caterpillar Tractor Co., Peoria, Ill. Mr. Madacey was born in Toledo, O., and attended Muskegon, Mich., schools. He worked in a supervisory capacity at Lakey Foundry & Machine Co. Inc., Muskegon, for a time, and joined Caterpillar Tractor Co. in 1930. He became coreroom general supervisor in 1936 and six years later was instrumental in organizing and building the company's aluminum air-cooled cylinder head foundry of which he was superintendent. He became gray iron foundry superintendent in 1944. Mr. Madacey was one of the original committee that organized and developed the Central Illinois Chapter in 1945 and was its first vice chairman.

♦ ♦ ♦

R. J. Leckrone has been appointed chief engineer in charge of engineering and machinery sales, Pittsburgh Steel Foundry Corp., Glassport, Pa. Mr. Leckrone, a mechanical engineering graduate of University of Pennsylvania, has been designing engineer for Lewis Foundry & Machine Division, Blaw-Knox Co., Groveton, Pa., for the last 8 years. Prior to that he was associated with Continental Foundry & Machine Co., Pittsburgh, as a special engineer, following his return from Russia at the close of a three-year contract as chief engineer in charge of American specialists in the design and installation of rolling mill equipment for the Soviet Union at Kramatorskie, in the Ukraine. Mr. Leckrone, in his new appointment, will head Pittsburgh Steel Foundry Corp.'s engineering activities for both its plants, at Glassport and McKeesport, Pa., as well as its sales activities in the general machinery field, with his headquarters in Pittsburgh.

♦ ♦ ♦

Cleve H. Pomeroy, recently vice president and secretary-treasurer, National Malleable & Steel Castings Co., Cleveland, has been elected president, to succeed the late **Charles H. McCrea.** Mr. Pomeroy became associated with the company in 1920 as credit manager, advancing to assistant treasurer, treasurer, secretary and treasurer. He was elected vice president in charge of finances and accounting in 1944 and has been a member of the board of directors since 1938. He will retain his duties as treasurer. A graduate of Adelbert College of Western Reserve University, Mr. Pomeroy was engaged in the investment business for several years before joining National Malleable. **A. E. Field,** assistant secretary, has been made secretary.

♦ ♦ ♦

Walter G. Brayer, recently elected president of the Rochester Chapter of the AFA, is foundry superintendent, Bausch & Lomb Optical Co., Rochester, N. Y. Mr. Brayer was graduated from University of Michigan in 1918 and following a year of World War I Navy service he became superintendent, Co-Operative Foundry, Rochester, N. Y. In 1929 he joined Bausch & Lomb Optical Co. He is an active member of the Rochester Chapter of the AFA and served as its vice president last year.

♦ ♦ ♦

Bruce W. Schafer, the last three years traveling sales engineer, Detroit Electric Furnace Division of Kuhlman Electric Co., Bay City, Mich. has been appointed manager of the sales and service department. A graduate of Michigan State College where he received his degree in chemical engineering in 1939, Mr. Schafer served for four years in the magnesium research department of Dow Chemical Co., Midland, Mich. **Charles V. Kilburn** will assist Mr. Schafer in sales engineering as new head of the research and engineering department of the division. Mr. Kilburn joined Detroit Electric Furnace Division in 1939 as design engineer, following his graduation from Michigan State College where he received his degree in mechanical engineering.

♦ ♦ ♦

Homer A. Size and **Arthur X. Nelson** have been appointed representatives of the Industrial Division of Bryant Heater Co., Cleveland, in the application of Bryant gas combustion elements to industrial and process heating equipment. Mr. Size will represent the division in California and Mr. Nelson, operating Plant Equipment Inc., will serve the Minneapolis area.

♦ ♦ ♦

Gail Rutledge has been appointed midwestern regional sales manager, General Detroit Co., with headquarters in Chicago. He was recently assistant to the vice president and co-ordinator of national accounts and branch operations—a position which is now held by **Harold J. O'Neill,** who joined the company in 1942 as manager of the carbon dioxide extinguisher plant.

♦ ♦ ♦

E. L. Krejci, works manager, American Steel Foundries, Chicago, has been appointed Hammond, Ind., community chairman of the Committee for Economic Development, New York, which has engaged in an intensified program of research designed to encourage national economic policies for the maintenance of high levels of production, distribution and employment throughout the country.

♦ ♦ ♦

Earl Beyerlein has been appointed foundry superintendent, Schmutz Foundry & Machine Co., Louisville. Mr. Beyerlein attended Purdue University and has been associated with Hamilton Foun-

(*Continued on page* 104)

Z. MADACEY

R. J. LECKRONE

CLEVE H. POMEROY

WALTER G. BRAYER

Get the 10% Extra Capacity in MODERN PHILCO BATTERIES

For hard continuous work, Philco pioneered the modern extra capacity battery that provides 10% additional capacity with no increase in overall dimensions. This great advantage was first made available in Philco Type XL and XVL Batteries, and is an outstanding feature of the famous Philco "Thirty" . . . the battery with 30% longer life. For today's heavier work schedules, make sure of *all* the capacity you can get. Specify a modern Philco. Write today for new catalogs.

PHILCO CORPORATION · STORAGE BATTERY DIVISION · TRENTON 7, NEW JERSEY

PHILCO

FOR 50 YEARS A LEADER IN INDUSTRIAL STORAGE BATTERY DEVELOPMENT

Wheelabrator

SPEED CLEANING · COST REDUCTION

proved in AUTOMOTIVE industry

TODAY more automotive castings . . . . in tonnage and variety of types and sizes . . . . are cleaned by the airless Wheelabrator than by any other method.

In an industry such as this where *production* must be perfectly synchronized . . . . where the *quality* of every operation must match rigid standards . . . . where *unit-cost* reduction is a watchword . . . . only the most efficient production equipment can survive the acid test of practical economics. Significant, therefore, is the wide general use of the Wheelabrator in this highly competitive industry. *Performance* is the gauge by which it has been measured and proved. To outsell it had to outperform. And it is on that convincing basis that we urge you to investigate it. Ask for a demonstration . . . . or write for further information.

TYPICAL USERS

Campbell, Wyant and Cannon
A. C. Spark Plug Div.
Auto Specialties Mfg. Co.
Bendix Products Corp.
General Motors Corp.
Clark Equipment Co.
Electric Auto-Lite Co.
Ford Motor Co.
International Harvester Co.
Kelsey-Hayes Wheel Co.
Liberty Foundry Co.
National Mall. & Steel Cstgs. Co.
Thompson Products, Inc.
Chrysler Corp.
Allis-Chalmers Mfg. Co.
Centrifugal Fusing Co.
Wilson Foundry & Machine Co.
Cummins Engine Co.
Caterpillar Tractor Co.
Briggs & Stratton Corp.
Packard Motor Car Co.

WHEELABRATOR TUMBLASTS

Eight standard sizes ranging from 1 cu. ft. to 63 cu. ft. capacity for cleaning loads in which individual pieces may vary from a fraction of an ounce to hundreds of pounds each.

WHEELABRATOR TABLES

Made in Plain Table, Swing Table and Multi-Rotary Table Types and in numerous standard sizes for cleaning flat or fragile work that is not adapted to tumbling.

WHEELABRATOR CABINETS

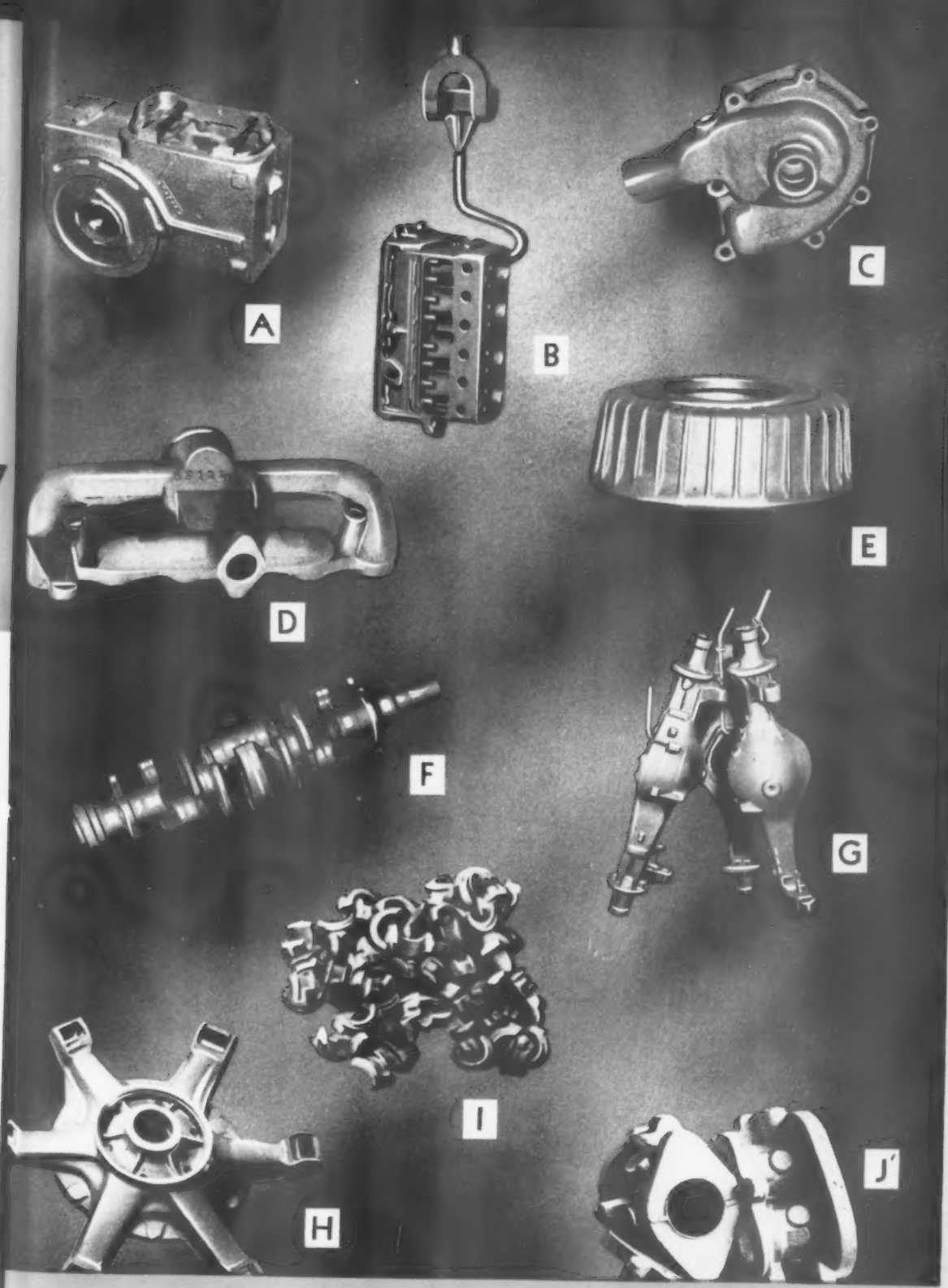
Cabinets are designed for special production requirements or where work cannot be adapted to a standard machine. Examples: cylinder blocks, bath tubs, crankshafts, etc.

American

FOUNDRY EQUIPMENT CO.

505 S. Byrkit St. Mishawaka, Indiana

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT



AUTOMOTIVE CASTINGS like these are being WHEELABRATED

- Brake drums
- Pistons
- Cylinder blocks
- Water pumps
- Bearing Caps
- Clutch housings
- Banjo housings
- Truck hubs
- Valve guides
- Cylinder heads
- Bogie wheels
- Crankshafts
- Cylinder liners
- Motor supports
- Differential housings
- Clevis bolts
- Axle housings
- Crankcases
- Fuel pumps
- Carburetors
- Transmission housings
- Piston rings
- Oil pumps
- Pump bodies
- Distributor housings
- Fan pulleys
- Pump impellers
- Shock absorber pistons
- Oil pans
- Motorcycle castings
- Auto hardware
- Gear housings
- Manifolds

(A) TRANSMISSION HOUSINGS. A Wisconsin foundry reduced the time for cleaning 8 housings from ½ day to only 7 minutes in a Wheelabrator Tumblast.

(B) CYLINDER BLOCKS. At an Indiana foundry, 140 six cylinder blocks are cleaned hourly in a Wheelabrator Cabinet with three Wheelabrator units.

(C) WATER PUMPS. The Mack Truck Co. cleans small parts such as water pump housings in a 48" x 72" Wheelabrator Tumblast. More than 2000 pounds of these castings are cleaned in eight minutes.

(D) MANIFOLDS. Fourteen tractor manifolds are cleaned in six minutes in a 36" x 42" Wheelabrator Tumblast at Headford Bros. & Hitchins Fdry. Co., Waterloo, Ia.

(E) BRAKE DRUMS. Production was increased from .45 tons per hour using tumbling mills to 1.85 tons with a 36" x 42" Wheelabrator Tumblast at Brillion Iron Works.

(F) CRANKSHAFTS. 300 cast automobile crankshafts per hour are cleaned at Auto Specialties Mfg. Co., Benton Harbor, Mich. in a Monorail Cabinet equipped with four Wheelabrator units.

(G) AXLE HOUSINGS are cleaned by The Dayton Malleable Iron Co., in a Monorail Cabinet equipped with two Wheelabrators. A 2½ minute exposure to the blast is sufficient to remove all sand and scale from the exterior and critical interior surfaces.

(H) TRUCK WHEELS. Typical loads consisting of 11 wheels weighing 190 pounds each, or 16 wheels weighing 75 pounds each are cleaned in 10 minutes at an Ohio Steel foundry using a 48" x 72" Wheelabrator Tumblast.

(I) BEARING CAPS. 1800 pound loads of connecting rod bearing caps are cleaned in 8 minutes in a 48" x 42" Wheelabrator Tumblast at a leading Detroit automobile manufacturing plant.

(J) CARBURETORS. Enot Fdry. Co., reduced breakage of carburetor bowls from 20% in tumbling mills to practically nothing with a 36" x 42" Wheelabrator Tumblast. Cleaning time is only 3 minutes per load.

(*Continued from page* 100)

dry & Machine Co., Hamilton, O., Hansell-Elcock Co., Chicago, and more recently with Hershey Machine & Foundry Co., Manheim, Pa.

♦ ♦ ♦

I. B. Helburn has been appointed Cincinnati and southern Ohio representative, American Air Filter Co. Inc., Louisville. Mr. Helburn, a graduate of University of Kentucky, has been connected with the filter company for the last 22 years. He will handle the account in Cincinnati, under the name of Helburn Engineering. **A. C. Pfau** and **G. W. Vogel**, Pfau-Vogel Co., have been appointed Indianapolis representatives of the company, succeeding the late **Otto C. Ross**, who was representative there for 20 years. Mr. Pfau, a graduate of Purdue University, has served American Air Filter Co. in various engineering capacities for the last 12 years. Mr. Vogel was graduated from University of Kentucky and has been a member of the Dust Control Division of the company for 12 years. Prior to that he was a construction engineer with General Electric Co., Schenectady, N. Y., for 6 years.

♦ ♦ ♦

David Tamor, recently elected chairman of the Chesapeake Chapter of the AFA, is plant metallurgist, Malleable Foundry Division, American Chain & Cable Co., York, Pa. Mr. Tamor was graduated in metallurgy from Carnegie Institute of Technology in 1921, and became a mine surveyor, mine statistician and assistant mill superintendent in the mines of Matahambre, Pinar del Rio, Cuba. Later he was metallurgical assistant, U. S. Metals Refining Co., Carteret, N. J.; plant metallurgist, Reading Pratt & Cady, Division of American Chain & Cable Co. Inc., Hartford, Conn.; and consulting metallurgist, M. S. Little Co., Hartford. A former president of Connecticut Nonferrous Foundrymen's Association, Mr. Tamor has been active in committee work of the AFA and was a trainer in the training-within-industry courses in job instruction and job relations sponsored by that organization during the recent war.

♦ ♦ ♦

George W. Altman, recently released from active duty as a captain with the Army Engineers, has joined the foundry staff of Lennox Furnace Co., Columbus, O. Prior to entering military service Mr. Altman was a foundry engineer, Pittsburgh Coke & Iron Co., Neville Island, Pa. While in service he operated

GEORGE W. ALTMAN

a foundry for the Army in England and later in Aachen, Germany, making repair castings for engineer and ordnance heavy equipment.

♦ ♦ ♦

S. C. Massari, technical director, American Foundrymen's Association, has been appointed to the advisory committee on commercial standards, National Bureau of Standards, Washington.

♦ ♦ ♦

E. A. Tice has joined the corrosion engineering section of the Development and Research Division, International Nickel Co. Inc., New York, as a corrosion engineer. Mr. Tice has been associated with Bethlehem Steel in its research department as an engineer in the field of corrosion. He is a graduate of Rensselaer Polytechnic Institute.

♦ ♦ ♦

Dr. J. E. Hurst, eminent British metallurgist, Bradley & Foster Ltd., Darlaston Iron Works, Darlaston, Staffs., and H. H. Berresford, managing director, Staveley Coal & Iron Co. Ltd., Chesterfield, arrived in New York Oct. 25 on the first trip of the *Queen Elizabeth,* following her recent conversion from war to civilian service. During a month's itinerary in the United States, mailing address of Dr. Hurst and Mr. Berresford is American Cast Iron Pipe Co., Roebling Bldg., 117 Liberty St., New York 6.

♦ ♦ ♦

W. G. Wilkins, associated with Lester B. Knight & Associates, Chicago, has been named vice president and general manager of Universal Castings Corp., Chicago. Mr. Wilkins was formerly executive vice president and general manager of Key Co., East St. Louis, Ill. Universal Castings Corp. has entered into a management contract with Lester B. Knight & Associates and Mr. Knight has been elected to its board of directors.

♦ ♦ ♦

J. A. Hill, formerly manager of the New York branch office of Independent Pneumatic Tool Co., has been appointed manager of electric tool sales with headquarters in the company's general offices in Chicago. Mr. Hill has been associated with the tool company since 1920 **W. C. Rush** until recently in the St. Louis branch office, has been appointed manager of a new office recently opened in Cincinnati.

♦ ♦ ♦

George P. Eichelsbach Jr. has been made director of manufacturing and engineering, American Stove Co., Cleveland, in charge of manufacturing and engineering in all of its five plants. Mr. Eichelsbach has been associated with the

(*Continued on page* 106)

I. B. HELBURN

A. C. PFAU

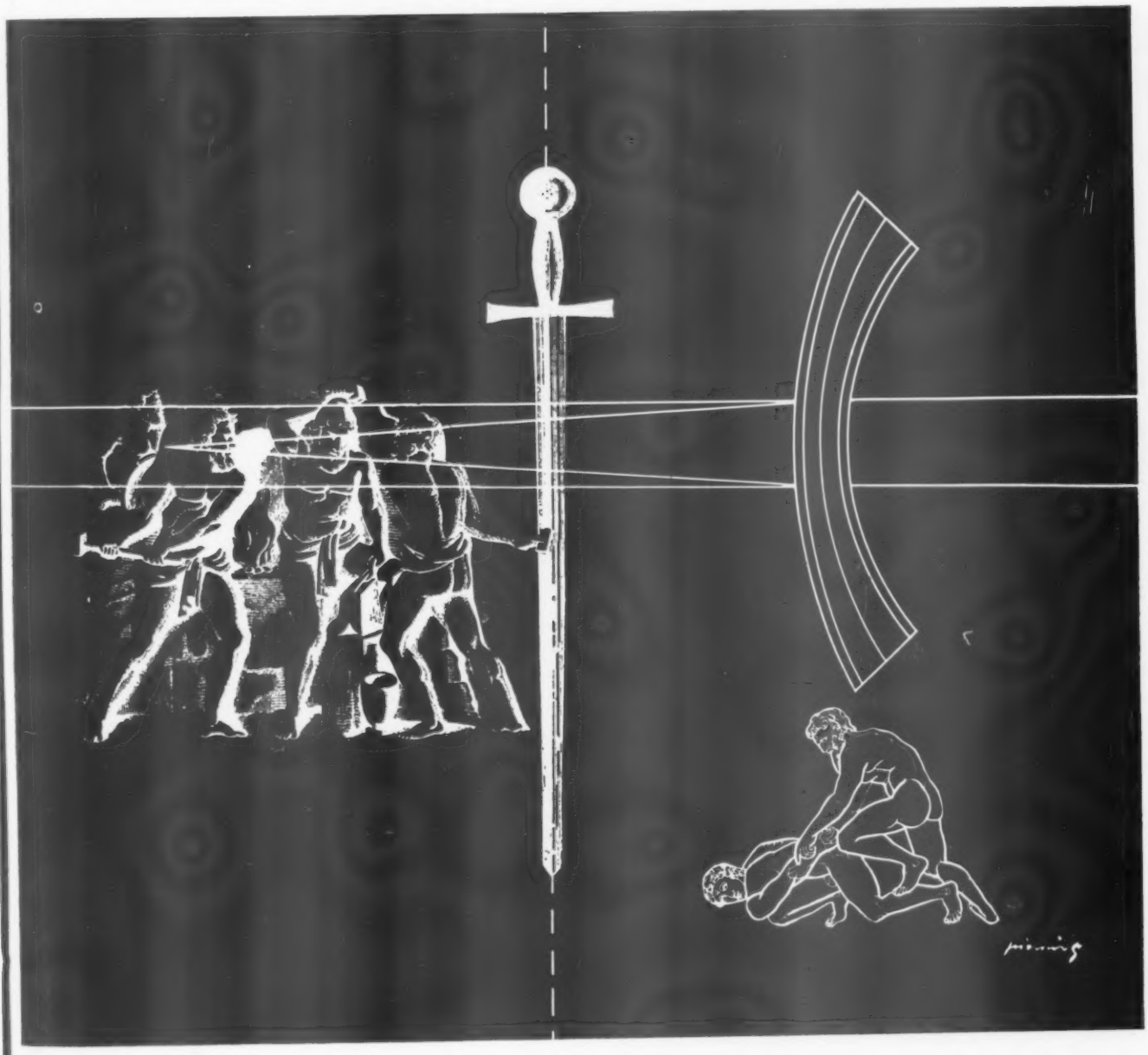
G. W. VOGEL

DAVID TAMOR

ONE CAME BACK

One of the legends surrounding the making of Damascus sword blades is that the smiths developed a delayed quench consisting of thrusting the heated blade into the body of a slave. This gave the required properties, but it was prodigal of manpower, and inconvenient besides. The smith usually had to leave town to do his heat treating in quiet.

Today, metallurgists can obtain properties they need in cast steel by simpler, less improvident means. A little molybdenum is one way of doing this. It is a proved means of obtaining the hardenability that assures good performance in service. Practical working data on molybdenum steels are available from Climax upon request.



MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"
CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

Climax Molybdenum Company
500 Fifth Avenue · New York City

MOLY

(*Continued from page* 104)

company since 1935 as engineering draftsman, chief engineer of the St. Louis division and chief engineer of the entire company.

♦ ♦ ♦

C. Edward Price has been elected president, Peninsular Grinding Wheel Co., Detroit. Mr. Price became associated with the company 11 years ago as sales manager and was later named vice president in charge of sales of the company.

♦ ♦ ♦

I. M. Emery, elected chairman of the Canton District Chapter of the AFA for 1946-47, is vice president and works manager, Massillon Steel Casting Co., Massillon, O., with which he has been associated for the last 25 years, and where he began his foundry career as a coremaker. Mr. Emery has been an active member of the American Foundrymen's Association and served on its nominating committee this year. He was vice chairman of Canton District Chapter last year and is currently chairman of the Technical and Operating Group, Division No. 5, Steel Founders' Society of America.

♦ ♦ ♦

John Doerfner Jr., new chairman of the Northern Illinois and Southern Wisconsin Chapter of the AFA, is chief engineer, Gunite Foundries Corp., Rockford, Ill. Mr. Doerfner entered the foundry industry in 1926, with the Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich. While associated with this foundry he attended General Motors Institute of Technology and was graduated in 1932 as an industrial engineer. In 1937 his services were loaned to McKinnon Industries Ltd., St. Catherines, Ont., subsidiary of General Motors Corp., Detroit, to assist in organizing the new malleable iron and gray iron foundries of that company. He was associated with Erie Malleable Iron Co., Erie, Pa., for two years, and joined Bendix Products Division of Bendix Aviation Corp., at South Bend, Ind., in 1940, where he was first in charge of gray iron foundry operations and later engaged in aluminum casting production when gray iron operations were abandoned. He was transferred to Eastern Aircraft Division of General Motors, Linden, N. J., and for two years was engaged in building airplanes for the Navy. He returned to the foundry industry at the close of the European war, joining Gunite Foundries Corp. as chief engineer. An active member of the Northern Illinois-Southern Wisconsin Chapter, Mr. Doerfner served as its treasurer last year.

♦ ♦ ♦

Edgar E. Ballard has joined Lester B. Knight & Associates Inc., consulting engineers, as senior engineer in charge of development and installation of foundry facilities for foundry modernization programs. He was formerly division plant engineer in charge of design, construction and maintenance of plants and plant facilities for the National Bearing Division, American Brake Shoe Co., St. Louis. Mr. Ballard has been active in the St. Louis Chapter of the American Foundrymen's Association.

♦ ♦ ♦

Carl W. Wade has been appointed superintendent, Indianapolis Brass & Aluminum Foundry Inc., Indianapolis. Mr. Wade has been training supervisor, Caterpillar Tractor Co., Peoria, Ill., since 1940. Starting as a foundryman apprentice in 1934, he became a foundry training instructor following completion of his training course, three years later. **Burt Bevis** has been named to succeed Mr. Wade as supervisor of pattern shop and foundry training at Caterpillar Tractor Co.

♦ ♦ ♦

Osman E. Erickson has been appointed superintendent of melting, Hanford Foundry Co., San Bernardino, Calif. Mr. Erickson previously had been associated with Pacific Iron & Steel Works Inc., Tacoma, Wash., for a number of years. He is a graduate of the College of Puget Sound and also attended Oregon State College.

♦ ♦ ♦

George H. Rockwell, general foreman, Caterpillar Tractor Co., Peoria, Ill., has been elected secretary-treasurer of the Central Illinois Chapter of the American Foundrymen's Association, succeeding **C. W. Wade** who has recently been appointed superintendent, Indianapolis Brass & Aluminum Foundry Inc., Indianapolis.

♦ ♦ ♦

John W. Mighton, recently released from three years of service with the Navy, has joined the magnesium sales staff of Dow Chemical Co., Midland, Mich., where he will handle sand and permanent mold casting orders. Mr. Mighton is a graduate of Carnegie Institute of Technology where he specialized in metallurgical engineering.

♦ ♦ ♦

Curtis H. Stout has been appointed Arkansas sales representative for the Stearns Magnetic Mfg. Co., Milwaukee, with headquarters in Little Rock, Ark. Mr. Stout until recently was associated with the Southwest Sales & Service Co., Little Rock, and prior to that with Westinghouse Electric Corp., St. Louis.

♦ ♦ ♦

Maurice D. Bennett has been appointed superintendent of research for the Stamford Division of the Yale & Towne Mfg. Co., Stamford, Conn., succeeding the late **Charles C. Ledin. Fred K. Heyer** will have charge of general research on locks and hardware.

♦ ♦ ♦

Elmer G. Davis has been appointed sales manager of the recently formed Buckeye Division, General Grinding Wheel Corp., Detroit. Mr. Davis will have offices at 3312 West 155th St.,

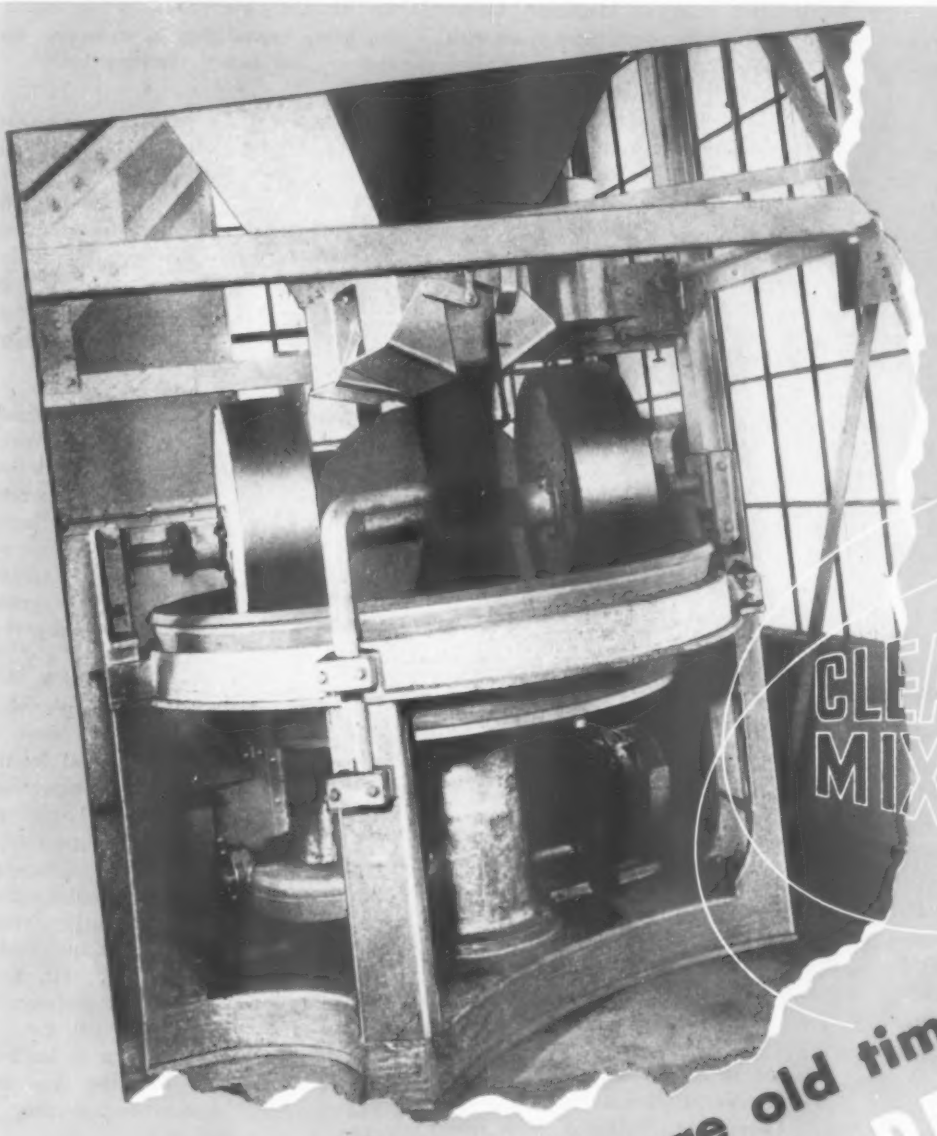
(*Concluded on page* 108)

C. EDWARD PRICE

I. M. EMERY

JOHN DOERFNER JR.

EDGAR E. BALLARD



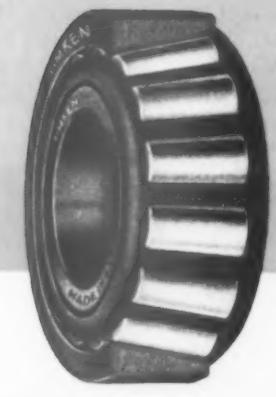
Tapered Roller
TIMKEN BEARING
EQUIPPED

CLEARFIELD MIXERS are old timers on TIMKEN BEARINGS

The Clearfield Machine Company, Clearfield, Pa., is one of the oldest users of Timken Tapered Roller Bearings serving the foundry industry. They are using more than ever today because their experience has proved that Timken Bearings not only make *better* machines but also *better selling* machines — for Timken Bearings are known and preferred the world over.

Shown in the photograph is the Clearfield No. 610 Sand Mixer, capacity 10 to 14 cubic feet. All working parts, including drive, revolving bottom, mullers and discharge disc are mounted on Timken Tapered Roller Bearings for smooth operation, long life and minimum power demand.

In any kind of foundry equipment, performance; dependability; endurance; and economy are in direct ratio to the number of Timken Bearings used. It will pay you to have them throughout your machines and to make sure the trade-mark "TIMKEN" appears on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio.



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

48 YEARS OF ENGINEERING AND METALLURGICAL DEVELOPMENT

(*Concluded from page* 106)

Cleveland, from which he will service Ohio on vitrified, rubber and resinoid bonded grinding wheels.

♦ ♦ ♦

Thomas H. Benners Jr., chairman of Birmingham Chapter of the AFA for the year 1946-47, is managing partner, T. H. Benners & Co., Birmingham. A native of Birmingham, Mr. Benners attended the public schools of that city and was graduated from Virginia Military Institute in 1920, with a degree in chemical engineering. He became associated with Woodward Iron Co., Woodward, Ala., working in the laboratory and blast furnace department, and some years later in the sales department for a short time. In 1921 he joined T. H. Benners & Co., where he has been engaged in the sale of foundry raw materials and coal. He served in the fiield artillery in World War I, and during the recent war was in the chemical warfare service, serving as operations and training officer at Allied Force Headquarters, in North Africa, and Sicily, with the rank of major. Mr. Benners has been an active member of the Birmingham Chapter since it was organized in 1936, and has served as chairman of its entertainment committee. He was vice chairman last year.

♦ ♦ ♦

B. E. Drury Jr., formerly assistant to the vice president in charge of sales, Wilson Foundry & Machine Co., Pontiac, Mich., has been appointed sales manager. Mr. Drury joined the Wilson organization in 1942. Prior to that he was sales manager, R. H. Bingham Co., Detroit.

♦ ♦ ♦

R. T. Leisk, recently elected chairman of the St. Louis District Chapter of the AFA, is assistant works manager at the East St. Louis, Ill., plant of American Steel Foundries, Chicago. A native of Wisconsin, Mr. Leisk was educated in the Milwaukee schools. Following completion of an apprenticeship with the Worthington Pump & Machinery Corp., Harrison, N. J., he spent three years with the Busch-Selzer Bros. Diesel Engine Co., St. Louis, as a journeyman pattern maker. He joined American Steel Foundries in that capacity in 1922, and a year later was appointed assistant pattern shop foreman. The following year he became general pattern shop foreman, and in 1940 he was made assistant works manager. Mr. Leisk has been an active member of the St. Louis Chapter and served as its vice chairman last year.

♦ ♦ ♦

Lynn N. Pangborn has joined National Foundry Sand Co., Detroit, as sales representative in Michigan and Indiana. Mr. Pangborn was associated with Blackmer Pump Co., Grand Rapids, Mich., for 19 years as purchasing agent and plant superintendent in charge of production, planning, purchasing and plant maintenance.

♦ ♦ ♦

Don M. Compton, formerly chairman of the Foote Bros. Gear & Machine Corp., Chicago, has been appointed chief of the Chicago Ordnance District, to succeed **Col. Joel G. Holmes,** who is being transferred to Joliet, Ill., as field director of ammunition.

♦ ♦ ♦

Walter B. Briggs, former manager of the Power Transmission Division, Ideal Industries Inc., has been appointed general manager, Power Transmission Division, Lovejoy Flexible Coupling Co., Chicago.

♦ ♦ ♦

James M. Surbrook has been elected vice president, Peninsular Grinding Wheel Co., Detroit. Mr. Surbrook, who joined the company in 1936, and has been treasurer for the last 4 years, will continue in that capacity.

♦ ♦ ♦

P. F. Bronckhurst has opened a western office for Hydropress Inc., New York, with headquarters in Denver. Mr. Bronckhurst has been a consulting engineer, specializing in hydraulic machinery and heavy machine tools.

♦ ♦ ♦

W. Harry Bailey has been appointed manager, coke and by-product sales, Alabama By-Products Corp., and A B C Coal & Coke Co., Birmingham. Mr. Bailey has been associated with Alabama By-Products Corp. since he was graduated from Birmingham Southern College in 1926, and for the last several years has been assistant manager, coke and by-products sales.

♦ ♦ ♦

Frank A. Mason has resigned as foundry superintendent, Attwood Brass Works, Grand Rapids, Mich., and will devote his time to his partnership in Foundry Service Engineers and Grand Rapids Foundry Supply House, Grand Rapids, Mich. Mr. Mason will act as adviser and consultant for the former company and sales engineer for the foundry supply house.

♦ ♦ ♦

Robert E. Kennedy has been placed in charge of foundry and pattern shop instruction work being conducted by the University of Illinois at its newly established Chicago branch. The university has leased Navy Pier in that city to accommodate more than 3000 students, and, pending establishment of its own facilities, is using Washburne Trade School for actual shop work in foundry practice and patternmaking. Mr. Kennedy formerly was assistant professor in charge of foundry practice with the university at Urbana, Ill., prior to his long period of service with the American Foundrymen's Association, starting in 1921.

♦ ♦ ♦

W. E. Lewis, vice president, Pittsburgh Lectromelt Furnace Corp., Pittsburgh, has been placed in charge of its new Chicago branch office, 309 North Michigan Ave. Mr. Lewis has been associated with the company for the last 25 years.

THOMAS H. BENNERS JR.

B. E. DRURY JR.

R. T. LEISK

LYNN N. PANGBORN

A cyclone and a Sly Dust Filter collect dust from grinding and sandblast operations on non-ferrous castings. The Sly Dust Filter is needed to collect completely all the fine dust which the cyclone could not catch.

SLY DUST Control

Gets ALL the Dust —EVEN THE VERY FINE DUST

it is the FINE DUST which does the damage . . .

The *fine dust* works its way into the bearings and other moving parts of machinery and settles widely over plant and neighborhood.

Only the *fine dust* is injurious to the human body. The coarser particles are stopped by the nose and mouth; only the very fine particles enter the respiratory system.

A combination of a Sly Dust Filter and a cyclone Collector is not uncommon. Often the cyclone does not collect the fine dust. Then a Sly Filter is added to get it all.

Sly Dust Collectors are not expensive —in first cost, maintenance, operation. Ask for Bulletin 98 and tell us your problem so that we can write you fully.

THE W. W. SLY MANUFACTURING CO. • 4753 TRAIN AVENUE • CLEVELAND 2, OHIO

SLY INDUSTRIAL DUST CONTROL

TUMBLING MILLS • BLAST CLEANING EQUIPMENT

Foundry Statistics

(Reported by Bureau of the Census)

Copper-base Alloy Castings

(Thousands of pounds)

	Shipments — Total	Sand	Perm. Mold	Unfilled *Orders
1946				
Jan.	72,265	65,107	1,886	71,827
Feb.	60,856	56,992	1,713	72,736
Mar.	74,971	66,076	2,353	70,622
Apr.	77,919	71,105	2,390	71,108
May	76,054	70,748	2,453	76,792
June	70,910	66,378	1,755	78,449
July	66,695	62,369	2,339	78,018

* For sale only.

Aluminum Castings

(Thousands of pounds)

	Shipments — Total	Sand	Perm. Mold	Unfilled *Orders
1945				
Jan.	45,588	27,168	10,692	.....
Feb.	44,091	26,674	9,844	.....
Mar.	50,275	29,473	12,355	.....
Apr.	46,320	27,090	11,185	.....
May	43,323	24,398	10,977	.....
June	39,074	21,050	10,254	.....
July	31,130	15,573	8,859	.....
Aug.	22,845	11,384	6,568	.....
Sept.	15,805	7,313	5,325	.....
Oct.	19,825	8,410	7,647	.....
Nov.	18,961	8,137	7,305	.....
Dec.	17,770	7,222	7,248	.....
1946				
Jan.	23,568	9,556	10,131	83,541
Feb.	23,231	11,613	7,866	94,858
Mar.	26,661	10,792	11,305	97,013
Apr.	27,692	11,562	11,010	100,267
May	29,179	11,827	12,220	117,710
June	28,496	11,674	11,767	118,747
July	28,828	10,706	12,213	124,457

* For sale only.

Magnesium Castings

(Thousands of pounds)

	Shipments — Total	Sand	Perm. Mold*	Unfilled Orders†
1945				
Jan.	10,424	6,149	4,028	....
Feb.	10,366	5,832	4,317	....
Mar.	12,646	6,703	5,677	....
Apr.	11,903	6,257	5,464	....
May	12,134	6,081	5,865	....
June	10,566	4,878	5,473	....
July	9,838	3,961	5,677	....
Aug.	4,960	1,820	3,036	....
Sept.	169	137	13	....
Oct.	251	216	13	....
Nov.	236	208	15	....
Dec.	261	230	14	....
1946				
Jan.	398	349	16	3,114
Feb.	438	366	35	3,338
Mar.	594	525	33	3,484
Apr.	570	465	36	3,297
May	661	587	45	3,778
June	717	623	46	4,063
July	628	477	53	3,986

* Includes incendiary bomb castings.
† For sale only.

Gray Iron Castings

(Net tons)

	Shipments — Total	For sale	Unfilled *Orders
1945			
Jan.	861,524	536,499	1,921,572
Feb.	816,467	511,184	1,998,270
Mar.	927,925	587,380	2,089,046
Apr.	842,979	532,015	2,031,668
May	866,951	542,337	2,031,318
June	849,449	543,788	2,015,625
July	748,790	468,017	2,015,005
Aug.	750,050	462,364	1,817,801
Sept.	717,768	434,416	1,754,515
Oct.	767,209	461,720	1,741,981
Nov.	751,092	445,952	1,847,468
Dec.	678,091	397,529	1,877,095
1946			
Jan.	706,319	446,567	2,076,994
Feb.	541,177	368,384	2,152,766
Mar.	796,068	505,431	2,265,336
Apr.	856,678	529,323	2,378,348
May	757,041	454,194	2,491,811
June	735,060	435,866	2,633,118
July	810,829	475,059	2,668,782
Aug.	944,516	558,957	2,785,609

* For sale only.

Malleable Iron Castings

(Net tons)

	Shipments — Total	For Sale	Unfilled *Orders
1945			
Jan.	78,788	54,111	345,112
Feb.	75,220	51,089	341,558
Mar.	85,307	58,711	349,935
Apr.	76,065	51,011	346,421
May	79,565	52,789	328,471
June	71,992	47,510	285,210
July	55,813	35,439	284,017
Aug.	52,647	33,239	282,136
Sept.	46,960	28,506	219,905
Oct.	59,096	37,307	229,618
Nov.	57,315	36,007	227,309
Dec.	51,963	35,168	236,648
1946			
Jan.	53,685	38,181	245,878
Feb.	40,156	29,338	247,644
Mar.	50,235	33,978	263,227
Apr.	65,010	36,298	275,055
May	62,598	34,975	279,065
June	61,650	35,468	275,845
July	64,446	38,021	271,981
Aug.	68,603	41,345	272,440

* For sale only.

Steel Castings

(Net tons)

	Shipments — Total	For Sale	Unfilled Orders
1945			
Jan.	210,213	165,116	983,137
Feb.	191,361	152,082	1,045,374
Mar.	222,591	173,506	1,047,660
Apr.	197,737	154,883	1,018,930
May	192,921	149,623	852,877
June	173,685	129,193	776,265
July	139,315	102,428	728,397
Aug.	131,411	98,080	565,559
Sept.	114,613	83,751	513,758
Oct.	130,344	99,495	460,339
Nov.	123,048	91,409	443,773
Dec.	115,239	85,391	434,287
1946			
Jan.	99,058	77,071	*358,926
Feb.	57,423	45,151	390,077
Mar.	101,396	80,843	412,325
Apr.	146,327	108,586	392,790
May	129,211	94,630	381,654
June	123,551	91,715	361,293
July	119,157	84,422	362,581
Aug.	130,450	94,653	374,731

* For sale only. Unfilled orders for 1945 include tonnage for sale and own use.

Metal Congress At Atlantic City

Twenty-eighth National Metal Congress sponsored by the American Society for Metals will be held at Atlantic City, N. J., Nov. 18 to 22. Co-operating societies include the American Institute of Mining and Metallurgical Engineers (Institute of Metals Division and Iron and Steel Division), American Welding Society, and the American Industrial Radium and X-ray Society. It is expected that nearly 400 manufacturers of metallurgical and metalworking products will have exhibits and displays covering 250,000 sq ft of floor space at the Municipal Auditorium.

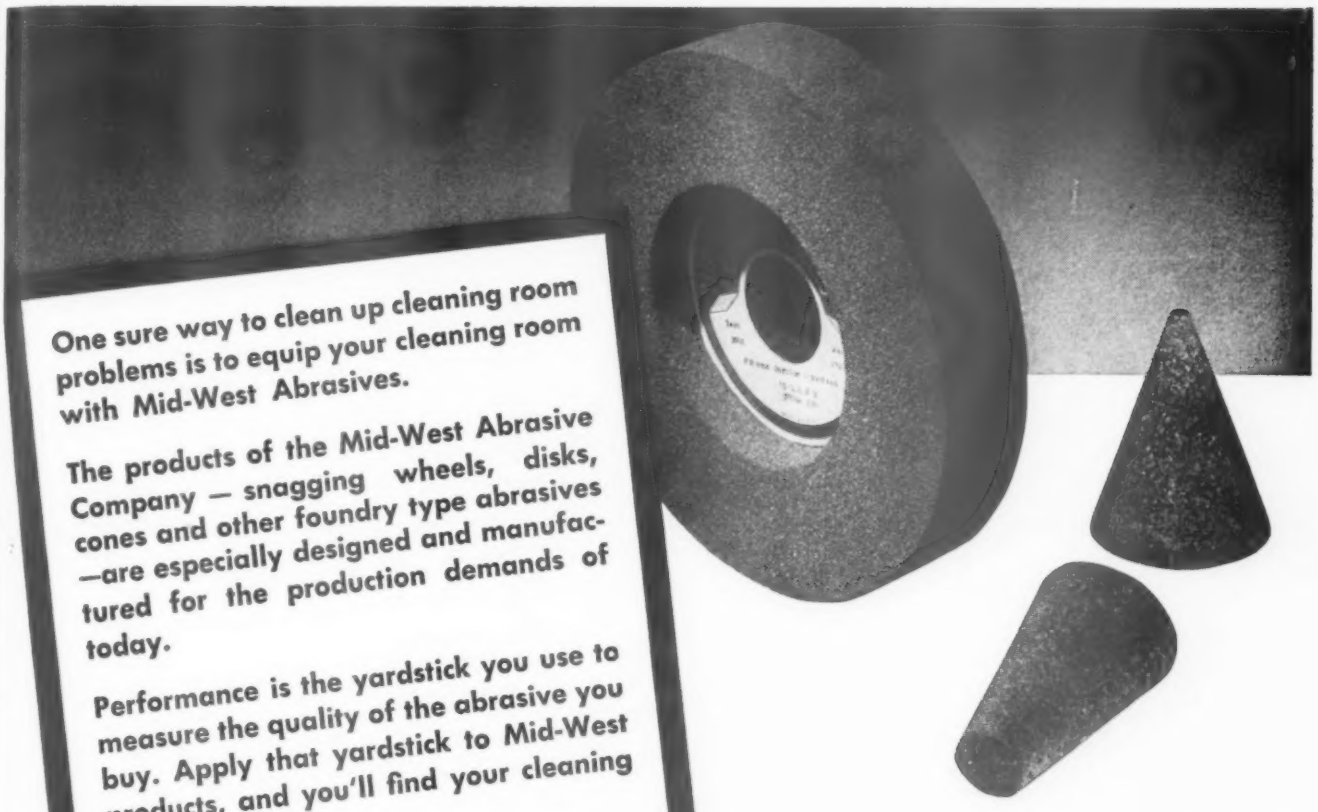
American Society for Metals will hold 21 technical sessions at which 64 papers will be presented covering a wide range of topics relating to metalworking and allied fields. In addition the society has arranged a series of educational lectures on metallurgical subjects. These will be held afternoons and evenings. Five lectures each will be devoted to "Electronic Methods of Inspection of Metals", "Physical Metallurgy of Aluminum" and "Sleeve Bearing Metals". Three lectures will be presented by Alfred Boyles, U. S. Pipe & Foundry Co., Burlington, N. J., on the "Structure of Cast Iron". Annual Campbell Memorial lecture will be presented Wednesday afternoon, Nov. 20, by J. B. Austin, United States Steel Corp.

Institute of Metals Division, AIME, will hold three technical sessions at which ten papers will be presented. Annual lecture of the division will be presented Wednesday afternoon, Nov. 19, by William Hume-Rothery, Oxford University, England. In addition the Institute of Metals Division will hold two joint sessions with the Iron and Steel Division. The latter will hold three technical sessions at which six papers will be presented. Annual fall dinner of the combined divisions will be held Tuesday evening, Nov. 19.

American Welding Society has arranged a full program for the week comprising 29 technical sessions at which about 80 papers will be presented.

Annual Adams lecture of the society will be presented by Wendell F. Hess, Rensselaer Polytechnic Institute on Monday night, Nov. 18 while the annual dinner will be held Thursday night, Nov. 21.

Technical sessions of the American Industrial Radium and X-ray Society will begin on Wednesday, Nov. 20, and continue through Friday, Nov. 22. During that time five sessions will be held at which 23 papers will be presented. The 1946 Mehl lecture of the society will be presented Thursday afternoon, Nov. 21, by Herman E. Seemann, Eastman Kodak Co.



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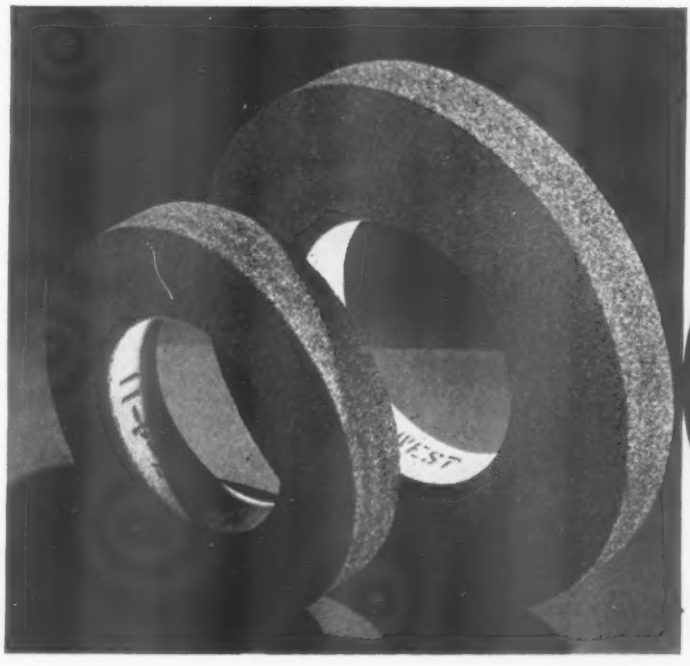

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Around DETROIT

By A. H. ALLEN
Detroit Editor
THE FOUNDRY

December expected to see little automobile production as assembly lines limp to virtual stop awaiting build-up and balancing of raw material and parts inventories

DESPITE continuous and valiant efforts to push automobile production to the high ground of 1941 and beyond, it has been a losing battle all the way. Shortages and depleted inventories of sheet and strip steel have proved incurable, primarily as a result of the big holes punched in steel production earlier this year by the steel, coal and rail strikes. Hand in hand with the lack of flat-rolled steel has been the drouth of pig iron, coke and scrap for foundries which still persists despite all sorts of costly expedients.

Upshot is that by Dec. 1 automobile assembly lines may limp to a virtual stop, not to resume until after the turn of the year. Many plants figure to run out their much-revised 1946 passenger car schedules by Thanksgiving or a little later, and they are hoping a 30-day closing may serve the dual purpose of allowing for what styling changes may be necessary to face-lift a 1946 into a 1947 model and of permitting a sufficient build-up and balancing of inventories, both parts and materials, to insure sustained high-level production after Jan. 1.

First sharp cutback developed in Chrysler plants early last month, with about a 40 per cent slash in passenger car assemblies and gradual dismissal of an estimated 30,000 or more, many of whose notices stated there would be little chance of any more work this year. The retrenchment appeared to go right through all manufacturing departments, the Dodge foundry, for example, cutting out its third shift. Then an unauthorized walkout of 13 cranemen in the Ford open-hearth department resulted in complete knocking out of all steel production at the Rouge plant, meaning a weekly loss of 13,000 tons of ingots, a good proportion of which is rolled into sorely needed sheet and strip. Ford meanwhile was finding it increasingly difficult to keep shipments of steel from outside mills in tempo with car production, and the only solution seemed to be a partial or complete suspension of manufacturing operations.

General Motors procurement experts, particularly in the Fisher Body Division, which uses large tonnages of sheet and strip, were taking a long and sober squint at the steel outlook, and the way they figured, inventories would be down to the bottom of the barrel by Dec. 1, lending further credulity to the report of an industry-wide shutdown at that time for a breathing spell to recoup inventories and floats. Strangely enough, stocks of some parts going into car assemblies are two to three times normal, indicating how far out of balance the inventory picture has tilted.

Beyond the difficulties with shortages in supplies, there is a basic reality with which all companies are faced. Briefly it may be summed up by the following figures on employment, weekly payrolls and production for January, 1941, compared with July, 1946: Employment 559,000 in 1941 and 699,000 in 1946, up 25 per cent; payrolls $20,277,000 against $35,608,000 this year, up 75 per cent; and production 500,878 against 297,496 this year, or *down* 41 per cent. While there was some improvement in these relative positions realized during August, September and October, the figures show graphically why car production has been a losing proposition for most of this year, even with the cushioning effect of tax carrybacks. Now next year there will be no tax credits to whittle down losses, so if the industry expects to operate in the black, there is only one course—make the necessary preparations for sustained high-level production, and trim costs sufficiently to erase the red ink.

One of the most disturbing elements in costs has been the high proportion of nonproductive labor in unit costs of manufacturing. Hundreds of expediters have been roaming the country to buy scarce items. Parts and materials have been shipped in millions by costly air express and express instead of the normal freight shipment. Little or no thought has been given to the cost of materials or parts; the only question has been: Can we get them and keep the lines going?

If there is no carbon steel available, then use alloy and forget the price. If there is no core wire to be had, make the cores without wire and throw out the ones that will not stand up. If there is no pig-iron to be had from regular suppliers, buy some from Mexico, from Utah, from California and never mind the freight. Or perhaps, as General Motors did, trade 15,000 tons of production scrap to a hungry steel mill for an equivalent tonnage of pig iron. Or, as Ford did, make a deal to barter several thousand tons of coke for an equivalent tonnage of pig iron. Or occasionally, if you have to go to the so-called black market for a scarce commodity, buy it anyway and worry about the price later.

Disregard the Cost

Perhaps one explanation for the rather universal disregard of costs is that the same thing was routine during the war years and it has been difficult to stop. Much the same situation applies to personnel. During the war, administrative, engineering, purchasing and other managerial staffs were expanded enormously, executives were moved up the salary ladder willy-nilly to make room for more at the bottom. For a time there was hope that sufficient production of automobiles could be realized to justify these over expanded supervisory staffs. There was hope of making two-shift operations on assembly lines the order of the day, while 'round-the-clock functioning of tributary departments like foundries and machine shops would be required. Unfortunately, these ambitions were not realized and do not appear likely of realization in the near-term. Therefore the only way to get nonproductive labor down to its normal level is to downgrade personnel, reduce salaries and dismiss those whose services are not definitely needed. This pruning operation—distasteful though it may be—is already under way and unquestionably will gain momentum. It may even spread to hourly rated workers on the lines, many of which even to the casual observer seem vastly overpopulated.

It is not hard to see, in the face of these gloomy trends, why many observers are predicting a rather sharp recession in industrial activity by the middle of next month, with unemployment increasing and the pressure for a price break mounting. After all, an automobile worker out of a job, whether for a month or for three months, is not a very good customer for $1 butter.

Meanwhile the UAW-CIO has announced an industry-wide campaign to improve wages and working conditions for more than 100,000 foundry workers, to be launched at a national foundry conference the union will hold in Milwaukee, Dec. 7-8. R. J. Thomas, of the UAW com-

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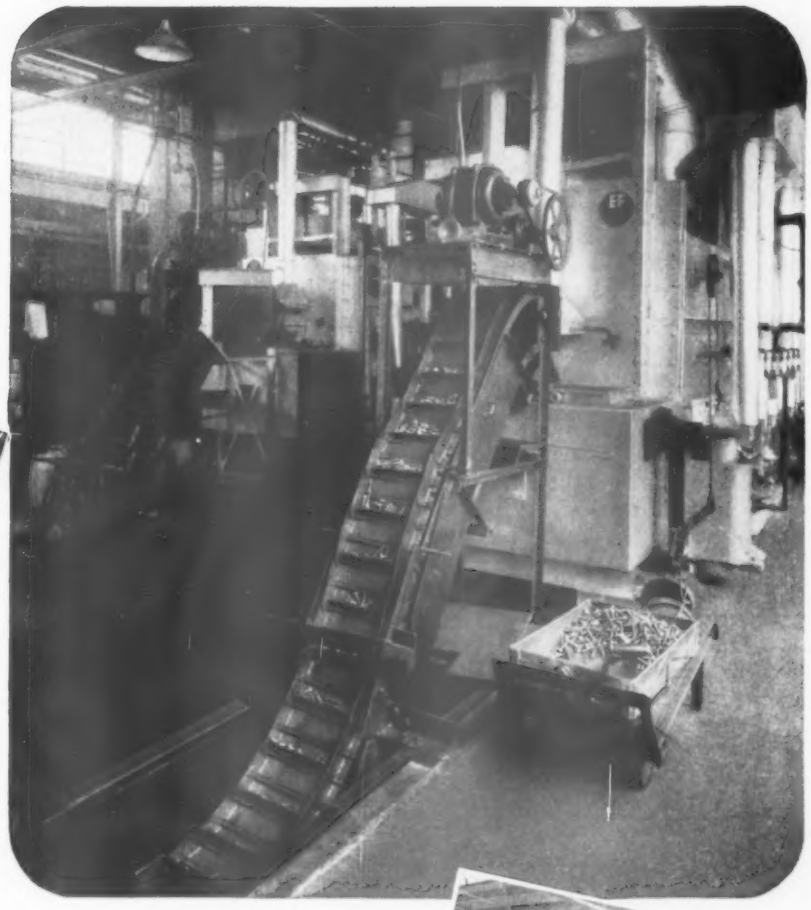

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Performance records of hundreds of installations prove that these furnaces are unsurpassed for the efficient economical heat treatment of a wide range of small and medium size parts ranging from washer and springs to tractor treads and engine parts. But send for our 12 page Bulletin No. R-1—"Chain Belt Conveyor Furnaces"—it gives full details—and let EF engineers, with their long and successful experience in building production furnaces for heat treating all types of products, work with you on your next heat treating job!

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GAS FIRED, OIL FIRED AND ELECTRIC FURNACES FOR ANY PROCESS, PRODUCT OR PRODUCTION

Salem-Ohio

(*Concluded from page* 112)

petitive shop department, is behind the move and he cites wage increases, wage equalization and the establishment of "decent working conditions" as his goals. The real motive is perhaps more clearly disclosed when Thomas says the program is vital "if thousands of jobs are not to be moved out of the organized plants with relatively high wages into low-wage outfits throughout the country." Just where the latter are located he does not indicate. At any rate, the foundry industry can probably look for more trouble in December when the "campaign" is instituted.

Abandonment of light-weight low-price passenger cars which Chevrolet and Ford were planning to introduce some time next year was the forerunner of the pessimistic turn which the automotive outlook has taken. Arnold Lenz, well-known foundryman, was in charge of the Chevrolet project on which considerable money had been expended, including plans for two new manufacturing plants in the Cleveland area. Although at first the Chevrolet suspension was described as a 60-day stop order, later it appeared the project was being abandoned in its entirety except for noncancellable contractual obligations. Presumably Mr. Lenz will return to the central manufacturing staff of General Motors and his force of 300-odd engineers, designers, buyers, estimators, etc., disbanded. Announcement of the Chevrolet cancellation was followed immediately by a terse announcement from Ford that its "low-price car" program likewise had been suspended. Later it was learned that Nash had a similar type of car in the planning stage, to be built on a 100-inch wheelbase, but this too has been terminated.

• • •

HARD-PRESSED for pig iron to keep up production of blocks, heads, flywheels and pumps for motors built by Continental Motors Corp. for Kaiser-Frazer passenger cars, Wilson Foundry & Machine Co., Pontiac, received some relief by a shipment of pig from Portsmouth Steel Corp., Portsmouth, O., in which Kaiser-Frazer purchased a substantial interest. Wilson also supplies gray iron castings requirements for its new parent company, Willys-Overland Motors in Toledo. Whether the expanding production plans of Willys which include engines for jeeps, a new line of trucks based on the jeep design, a new station wagon and a 6-cylinder passenger car to be introduced next May, will interfere with the supply of Kaiser-Frazer castings remains a much-discussed possibility. Continental, of course, has another source for castings, Lakey Foundry & Machine Co. in Muskegon, in which it has a substantial stock interest, but Continental is restricting its purchases to about 30 per cent of Lakey's capacity.

• • •

HOPING to cash in on the current heavy demand for cast iron soil pipe required in veterans' housing projects, two operators in this area were drawing plans for erecting a soil pipe casting plant, but when OPA price controls were re-established on the product after the brief coma into which the price control agency lapsed this summer, they dropped the project like a hot potato, realizing the utter futility of realizing a profit in the face of local labor rates as against those of southern foundries. The latter are also in a pretty squeeze between ceiling prices and sharply inflated labor rates resulting from the influx of war industries in the South.

EQUIPMENT ASSOCIATION

Holds Annual Meeting

OTTO A. PFAFF, president, American Foundry Equipment Co., Mishawaka, Ind., was elected president of the Foundry Equipment Manufacturers Association at the annual meeting of the society held at the Homestead, Hot Springs, Va., Sept. 24-26, succeeding Thomas Kaveny Jr., president, Herman Pneumatic Machine Co., Pittsburgh. William L. Dean, vice president and general manager, Mathews Conveyer Co., Ellwood City, Pa., was elected vice president of the association, and Arthur J. Tuscany, Cleveland, was re-elected executive secretary-treasurer.

New directors elected at the meeting are as follows: P. F. Bauer, Allis-Chalmers Mfg. Co., Milwaukee; H. S. Hersey, C. O. Bartlett & Snow Co., Cleveland; and Otto A. Pfaff, American Foundry Equipment Co., Mishawaka, Ind.

Attendance was the largest in the history of the association.

At the first session, President Kaveny outlined the work of the various FEMA committees during the last year and announced the recent formation of a Foundry Equipment Committee of the Industrial College of the Armed Forces. He also stressed the importance of the various product groups organized by the association during the last year. Secretary-treasurer Tuscany reported the finances of the society in a healthy condition.

R. L. McIlvaine, National Engineering Co., Chicago, described the activities of the Public Relations Committee, which included the development of an insignia for the association, the development of a bureau to provide speakers for meetings of foundrymen, a survey of the attention being given to foundry instruction by educational institutions of the country, and the operation of an association display booth at the Cleveland convention of the American Foundrymen's Association.

Product group activities were described

(*Concluded on page* 116)

WILLIAM L. DEAN

OTTO A. PFAFF

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Save on manpower, production hours, maintenance and replacements.
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AUTOMATIC STAR-RETURN WET CLEANING MILLS

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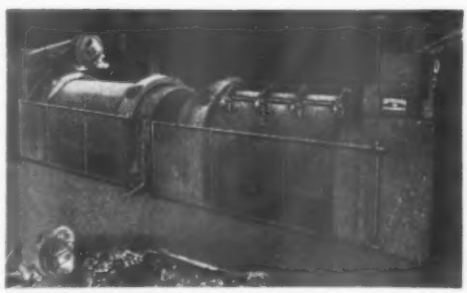
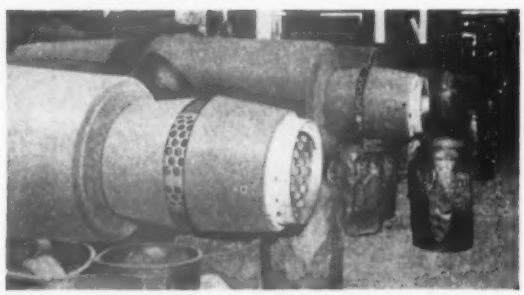
(A)



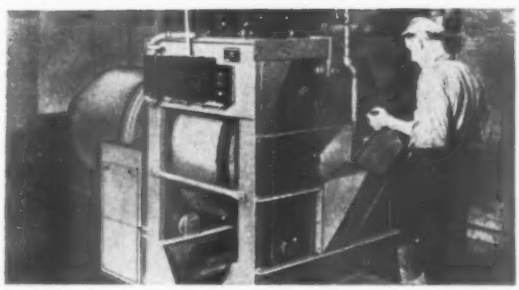
(A) Two side-loading, side-unloading mills for cleaning miscellaneous castings such as differential housings etc. Sand conveyor is in operation at back of mills. CLEANING TIME REDUCED 73%

(B)



(B) Tumbling piston ring castings before machining. Mills are equipped with additional screen for separating pollywogs or risers. NO MANUAL LABOR REQUIRED

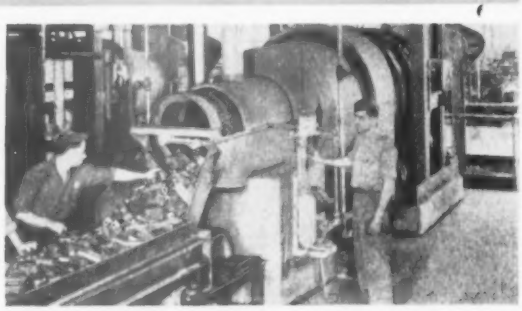
(E)



(E) 36" x 36". End-loading, end-unloading mill. Low charging height of 37" eliminates power loader. For low tonnage foundries making small castings.

(C) End-loading, end-unloading mill. Castings are cleaned twice: before inspection and sorting; after finish grinding, ready for plating. Work discharges onto inspection conveyor. Automatic power loader in pit, for floor level loading.

(C)



(D)

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(D) End-loading, end-unloading wet mill cleaning grey iron pipe fittings. Discharges directly onto sorting table. Power loader below floor level for ease in loading.

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After thorough tests we will render you a complete report, without cost to you.

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(*Concluded from page* 114)

briefly by the following chairmen: Dust control equipment, John Hellstrom, American Air Filter Co., Louisville; Molding machines, H. E. Fellows, Fellows Corp., Milwaukee; Sand treating and handling, William L. Hartley, Link-Belt Co., Chicago; Blast cleaning and tumbling, Frank W. Klatt, W. W. Sly Mfg. Co., Cleveland; Furnaces, cupolas and ladles, A. J. Grindle, Whiting Corp., Harvey, Ill.; Flask equipment, John T. Haggner, Sterling Wheelbarrow Co., Milwaukee. The first day of the convention was devoted entirely to group meetings.

Otto A. Pfaff led an interesting discussion on profit sharing and pension plans for employees.

At the second session President Kaveny discussed the recent action of OPA on foundry equipment. P. F. Bauer reported war surplus sales of foundry equipment and stated a timetable had been developed looking toward the sale or scrapping of surplus equipment within a year. President Kaveny and Frank G. Steinebach, editor of THE FOUNDRY, discussed the proposed National Castings Council.

Earl L. Shaner, president of the Penton Publishing Co., and a member of the President Truman Fact Finding Body, the Pauley Reparations Mission, described his trip around the world with that group. Mr. Shaner indicated the important contributions of American equipment, especially transportation equipment, in all of the countries he visited, and stressed the tremendous needs that now exist if these countries are to recover to any extent from the war.

FOUNDRY CONFERENCE

To Be Held in Chicago, Nov. 21-22

TWO general sessions, ten group sessions, two luncheons and a dinner will feature the program for the regional foundry conference to be held at Hotel Continental, Chicago, Nov. 21-22. Joint sponsors of the conference are the Chicago and Central Illinois chapters of the American Foundrymen's Association. Co-operating in the event are Illinois Institute of Technology, Chicago; Northwestern Technological Institute, Evanston, Ill.; and University of Illinois, Urbana, Ill.

The first general session, opening the conference, will deal with good housekeeping and plant maintenance, and the second, bringing the meeting to a close, will be devoted to core blowing. The ten group sessions include two each on gray iron, malleable, steel, nonferrous and patterns.

Speakers of national repute have been engaged for the two luncheons and the banquet.

Alfred W. Gregg, executive engineer, foundry equipment division, Whiting Corp., Harvey, Ill., is general chairman of the regional conference, and H. F. Scobie, educational assistant, national office, American Foundrymens Association, Chicago, is secretary.

Chairmen and co-chairmen of the five technical divisions are as follows: Gray Iron—Eugene W. Smith, sales representative, Western Materials Co., Chicago, and James T. Leisk, chief metallurgist, Chicago Hardware Foundry Co., North Chicago, Ill.; Malleable—G. B. Stantial, foundry superintendent, Illinois Malleable Iron Co., Chicago, and R. P. Schauss, metallurgical engineer, National Malleable & Steel Castings Co., Cicero, Ill.; Steel—C. V. Nass, vice president, Pettibone Mulliken Corp., Chicago, and Fred B. Skeates, foundry superintendent, Link-Belt Co., Chicago; Nonferrous—Oscar Blohm, chief metallurgist, Hills-McCanna Co., Chicago, and William B. George, metallurgist and foundry engineer, R. Lavin & Sons Inc., Chicago; and Patterns—H. K. Swanson, owner, Swanson Pattern & Model Works, East Chicago, Ind., Martin Rintz, foundry superintendent, Continental Foundry & Machine Co., East Chicago, Ind.

Details of the program follow:

THURSDAY, NOV. 21

9 a.m.—Registration.

10 a.m.—Address of welcome, by Dr. H. F. Moore, research professor of engineering materials, University of Illinois, Urbana, Ill. "Good Housekeeping and Plant Maintenance," by James Thomson, chief works engineer, Continental Foundry & Machine Co., East Chicago, Ind.

Luncheon

12 a.m.—Speaker: Dr. Henry T. Heald, president, Illinois Institute of Technology, Chicago.

Gray Iron

2 p.m.—"Cupola Refractories," by R. A. Witschey, ceramic engineer, A. P. Green Fire Brick Co., Chicago.

3:40 p.m.—"Cupola Control and Operation," by T. E. Barlow, research engineer, Battelle Memorial Institute, Columbus, O.

Malleable

2 p.m.—"Metallurgy of Malleable Iron," by Dr. C. H. Lorig, metallurgist, Battelle Memorial Institute, Columbus, O.

3:40 p.m.—"Malleable Gating and Feeding Practice," by J. H. Lansing, consulting engineer, Malleable Founders' Society, Cleveland.

Steel

2 p.m.—"Nonmetallic Inclusions and Residual Gases in Steel Castings," by F. W. Boulger, assistant supervisor of metallurgy, Battelle Memorial Institute, Columbus, O.

3:40 p.m.—"Welding of Steel Castings," by J. K. McDowell, welding engineer, Rock Island Arsenal, Rock Island, Ill.

Nonferrous

2 p.m.—"Budgeting Foundry Costs," by J. W. Wolfe, field representative, Non-Ferrous Founders' Society, Chicago.

3:40 p.m.—"Melting Problems of Special Bronzes," by Walter Edens, technical director, Ampco Metal Inc., Milwaukee.

Patterns

2 p.m.—"Co-operation Between the Foundry and the Pattern Shop," by Leonard F. Tucker, partner, City Pattern Works, South Bend, Ind.

3:40 p.m.—"Pressure Plate and New Pattern Equipment," by Melville E. Kohler, vice president, Scientific Cast Products Co., Cleveland.

Banquet

6 p.m.—Speaker: Clifton Utley, news analyst and radio commentator, Chicago. Entertainment.

FRIDAY, NOV. 22

Gray Iron

10 a.m.—"Sand Control," by G. W. Anselman, service engineer, Coebig Mineral Supply Co., Chicago.

10:40 a.m.—"Binders," by A. C. Den Breejen, research technician, Hydro-Blast Corp., Chicago.

11:20 a.m.—Discussion.

Malleable

10 a.m.—"Modern Malleable Melting and Annealing," by W. R. Jaeschke, field engineer, and C. R. Taylor, assistant engineer, equipment division, Whiting Corp., Harvey, Ill.

Steel

10 a.m.—"Hardenability of Steel Castings," by E. J. Wellauer, metallurgist, Falk Corp., Milwaukee.

Nonferrous

10 a.m.—"Causes of Gas Porosity in Aluminum Castings—How To Avoid It," by Hiram Brown, chief metallurgist, Solar Aircraft Co., Des Moines, Iowa.

10:55 a.m.—"Sand Properties and Their Relation to Casting Defects," by Fred Overstreet, foundry engineer, Illinois Clay Products Co., Chicago.

Patterns

10 a.m.—"Permanent Molds and Equipment," by V. J. Sedlon, president, Master Pattern Co., Cleveland.

Luncheon

12 m.—Speaker: Earl L. Shaner, president, Penton Publishing Co., Cleveland, publisher of THE FOUNDRY. Subject: "Around the World in 40 Minutes." Closing remarks, by Dr. O. W. Eschbach, dean, Northwestern Technological Institute, Evanston, Ill.

Core Blowing

2 p.m.—"Sands for Core Blowing," by A. W. Magnuson, sales engineer, Champion Foundry & Machine Co., Chicago.

"Pattern Equipment for Core Blowing," by Zigmond Madacey, foundry superintendent, Caterpillar Tractor Co., Peoria, Ill.

"Core Blowing Equipment," by L. D. Pridmore, vice president, International Molding Machine Co., Chicago.

SATURDAY, NOV. 23

9:30 a.m. and 11:30 a.m.—Inspection of Museum of Science and Industry. Special heats in model foundry for benefit of conference visitors.

2 p.m.—Northwestern-Illinois football game in Dyche Stadium, Evanston, Ill.

Apprentice Contest Prizes Raised

Prizes in the national apprentice contest of American Foundrymen's Association have been increased to $100, $50 and $25 for first, second and third places, respectively, in each of the four divisions of the annual competition, according to W. W. Maloney, secretary-treasurer. Awards previously were $30, $20 and $10. Sponsored by the association's apprentice contest committee, the competition opens in January of each year and closes just prior to the society's annual convention.

Contest divisions are gray iron, steel and nonferrous molding, and pattern-making. Apprentices may enter any or all divisions. Blueprints for the pattern-making contest and patterns for the molding competition are selected by the committee and supplied through AFA headquarters.

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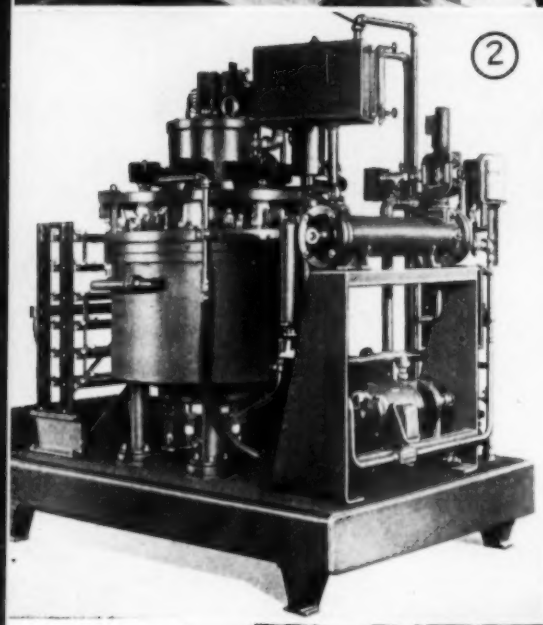


ELECTRONIC EQUIPMENT

For Induction Melting Alloy Steel

By S. R. DURAND
Application Engineer
Allis-Chalmers Mfg. Co.
Milwaukee

THE first installation in the United States for production melting of alloy steels using electronic frequency converting equipment was placed in service at the Michiana Products Corp., Michigan City, Ind., in June, 1946. This installation represents a new milestone in the so-called "Electron Era."

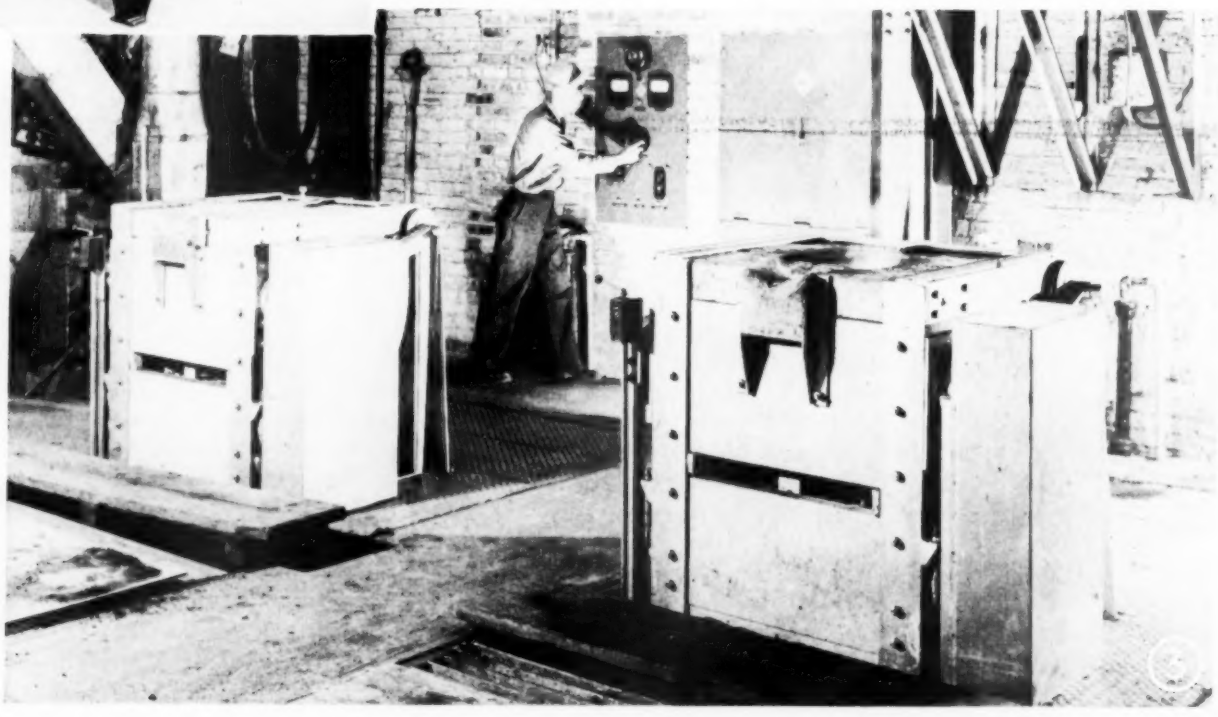
Mercury arc converters are not a new electronic device but their use for induction melting is a new application. Within the last twenty years more than 4 million kw capacity of mercury arc rectifier equipment has been installed in the United States for converting ac into dc power, and during the war more than 10 per cent of the electrical energy generated in this country was passed through mercury arc rectifiers installed in large electrochemical plants, electric traction systems, mines, steel mills, and many types of industrial plants.

However, the use of mercury arc units as frequency changers for converting 3-phase, 60-cycle, or 25-cycle power into single-phase, 1000-cycle power has been developed only within the last four years, and installations have been made only for forging and for melting of nonferrous alloys. The Michiana Products Corp. installation is the first used for melting alloy steels.

The 300-kw electronic frequency changing equipment is installed in a substation built onto the foundry building at the Michigan City plant. Two induction melting furnaces are installed in the foundry adjacent to electric arc furnaces. Each induction furnace has a capacity for melting 650 lb of steel, but the furnaces are of ample size so that coils for melting 1000 lb of steel can

(*Concluded on page* 120)

Fig. 1—Tapping a heat at Michiana Products Corp. Induction furnace tilting mechanism is under floor behind furnace.
Fig. 2—Steel-tank mercury arc converter for 1000-cycle induction heating has heat exchanger and vacuum pumps on same base
Fig. 3—Panel on wall several feet behind furnaces provides control and metering equipment for operator



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This is only one of many uses that Molybdenum serves to the betterment of foundry products. Its most valued effects are to strengthen and toughen—especially to improve high-temperature strength and uniformity of strength in both light and heavy sections. Foundry practice need not be altered at all when Molybdenum is added to any iron or steel composition.

The Molybdenum Corporation has a special pamphlet on the foundry uses of Molybdenum. As a supplier of Molybdenum, Tungsten, and other alloying materials, the Corporation welcomes the inquiries of any user.

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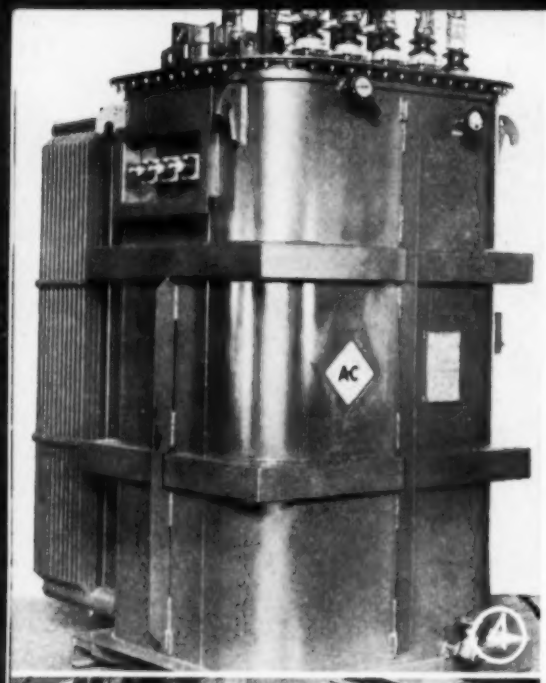

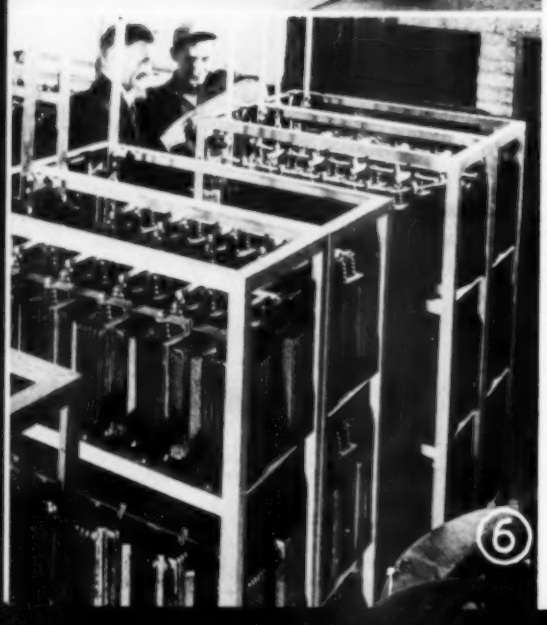

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be substituted in the future. Melting time is about three-quarters of an hour.

A small panel mounted in the wall behind the furnaces (Fig. 3) provides essential control and metering equipment for the furnace operator. On this control panel, a pistol-grip switch is provided for remote electrical closing or tripping of an oil circuit breaker, and a push-button switch is provided for starting or stopping oscillation of the electronic converter unit which supplies high frequency power to the furnaces. By means of a rheostat, power to a furnace can be adjusted to any desired value as indicated by a voltmeter and a kilowatt output meter.

Each furnace is equipped with complete tilting control mechanism operated by electric motors, both of which are located under floor plates behind the furnaces. The furnaces are factory-assembled units and are connected to the electronic power equipment by means of concentric cables run through shallow trenches in the floor.

The steel-tank mercury-arc converter (Fig. 2) is equipped with vacuum pumps for automatically maintaining a vacuum. The continuously evacuated rectifier tank has an indefinite life, with many of them already in service for 20 years.

Automatic Temperature Control

The converter tank is factory assembled on a base frame, which also contains a small water-to-water heat exchanger equipped with automatic temperature control devices. The arc drop heat loss in the tank is 1 per cent, or 3 kw for a 300-kw unit, so that about 2 gal of water per minute are required for automatic cooling the unit during operation at full load.

The transformer associated with the mercury arc electronic converter (Fig. 4) is furnished three-phase, 60-cycle power through an oil circuit breaker at 6900 v. High frequency power is supplied to the furnaces at 880 v.

The oil circuit breaker is a standard metal-enclosed unit (Fig. 5) which is throat-connected to the transformer. Auxiliary power transformers and protective relays are included in the assembly of the metal-clad switchgear unit.

The frequency at which the furnaces operate is determined by the inductance of the furnace coils and by the capacitance of a bank of condensers installed in the electrical equipment room. Fig. 6 shows the assembly of several frames of these oil-filled, self-cooled capacitor units. A feature of this type of installation is that it does not require constant attention of an operator to maintain a fixed frequency; the electronic equipment automatically changes frequency as a steel melt progresses, so that constant power factor is maintained on the furnaces at all times. In melting steel in an induction furnace the frequency increases about 100 cycles, so that if a melt is started at approximately 1000 cycles frequency, it will be completed with the furnace full of molten steel at about 1100 cycles frequency.

The Michiana Products Corp. specializes in the production of heat-resistant alloys, corrosion-resistant alloys, and special purpose alloys such as abrasion-resistant types. The heat-resistant alloys of the nickel-chrome-iron group are characterized by their ability to maintain their shape and strength and remain chemically inert at elevated temperatures. The most widely used corrosion-resistant alloys are of the standard 18-8 (stainless steel) and the 25 per cent Cr-12 per cent Ni types.

In certain types of corrosion-resistant steels it is desirable to maintain the carbon content at 0.10 per cent or less. One of the principal uses of the new induction melting equipment is to produce the very low carbon alloys such as 18-8 steels.

Book Review

Surface Active Agents, by C. B. F. Young and K. N. Coons, cloth, 381 pages, 5½ x 8½ inches, published by Chemical Publishing Co. Inc., Brooklyn 2. Price $6.

Surface tension phenomena are utilized in a diversity of industrial fields, and during the past ten years the technology of the processes has been developed rapidly. In this book the authors discuss the results of others in the field and conclusions drawn from their own research work to present useful information concerning the origin, effect and utilization of surface tension phenomena. The book is divided into two main parts of which the first deals with theory of surface tension, determination of that property, and the structure of wetting agents and specific surface-tension agents. The second part is devoted to discussions of emulsions; plating, metal cleaning, pickling and etching; cosmetics; leather; flotation; inks; textiles; cutting oils; adhesives; foods; lubrication; and soldering, brazing and welding.

Fig. 4—Transformer for 300-kw electronic frequency changer combines a 60-cycle transformer, high-frequency transformer and dc reactor

Fig. 5—Metal enclosed oil circuit breaker furnishes 3-phase, 60-cycle power to the transformer at 6900 v

Fig. 6—Capacitor tank for induction melting installation at Michiana

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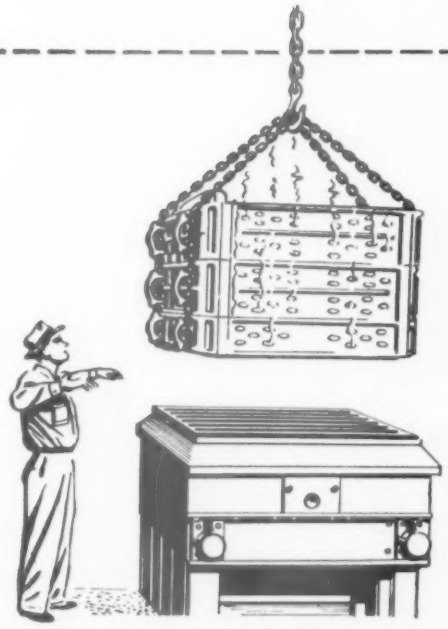

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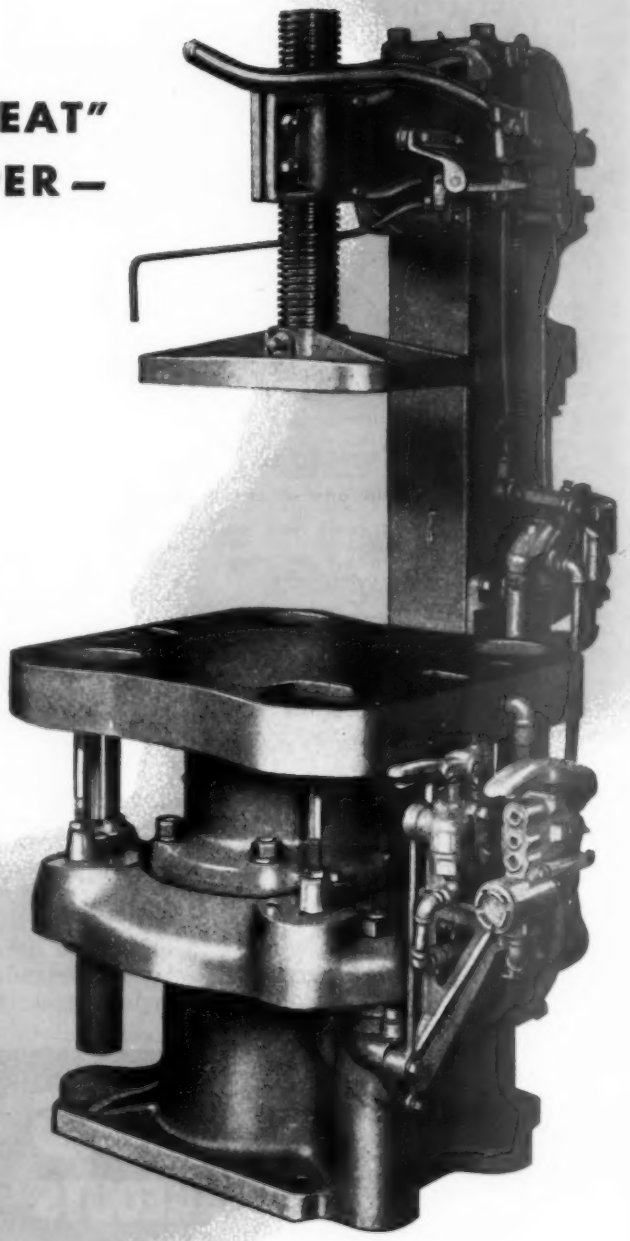

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MATCHPLATE PATTERNS

From Phenolic Casting Resin

By C. R. SIMMONS
Durez Plastics & Chemicals Inc.
North Tonawanda, N. Y.

AN INTERESTING method of making matchplate patterns using liquid phenolic casting resin has recently been perfected by Atlas Plastics Inc., Buffalo. This development is of special interest to foundrymen because of the rapidly increasing use of casting in foundry pattern work. It makes available to foundries the advantages of casting resin in match plate production.

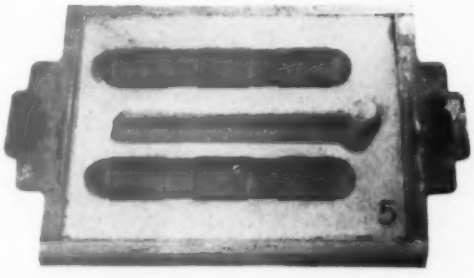
Considerable recognition has been given the use of cast resin patterns in recent months, and various examples have been cited in technical articles. However, these applications of phenolic casting resin primarily were for flat-backed or unmounted patterns. Realizing the advantages of casting resin patterns for certain types of production, Atlas Plastics Inc. began experimenting with a Durez casting resin from matchplates. The results of their work may be seen in Figs. 1 and 2. This matchplate is now in pattern storage after having given excellent service in its original production run. It was used in a jolt-squeeze machine at 50-lb pressure and showed no harmful effects whatsoever.

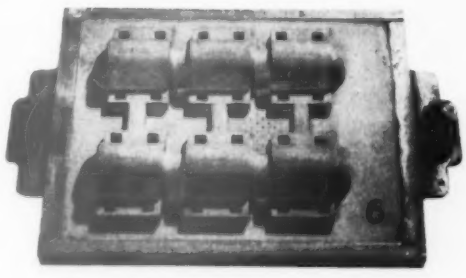
Before discussing the development of cast resin match plates, it seems pertinent to review the reasons why casting resins are desirable for patternmaking. There are three basic reasons: Pattern surface, weight, and cost. For good measure the attributes of ease of duplication and durability might be added. This latter characteristic would have no bearing in comparing plastic patterns with metal patterns.

Phenolic cast resin patterns have a smooth, almost glossy surface which is both hard and wear-resistant. Hot sand runs freely over the resin surface, and even when used with green sand these patterns give an excellent finish to the metal casting.

In general, it may be stated that cast resin patterns are approximately one-half the weight of aluminum and three-fourths the weight of magnesium. Just as in any pattern, design naturally affects the weight. While it is possible to equal resin pattern weight in aluminum or magnesium by coring, the cost of coring metal patterns for most jobs is considerably higher than for coring plastic patterns.

The subject of costs in patternmaking is a difficult and even precarious one to discuss. Since there do not appear to be any definite standards for pattern costs, to make claim to lower costs is to be almost immediately subjected to criticism. Design is an important consideration and the size and shape of the pattern will determine what saving can be effected with resin compared with use of other materials. Nevertheless, for pat-





Figs. 1 and 2—Drag and cope sides of matchplate made during early development work in use of casting resin for patterns. Figs. 3 and 4—This matchplate has cast resin patterns mounted on both sides of a metal plate. Figs. 5 and 6—Another example of matchplate made from casting resin

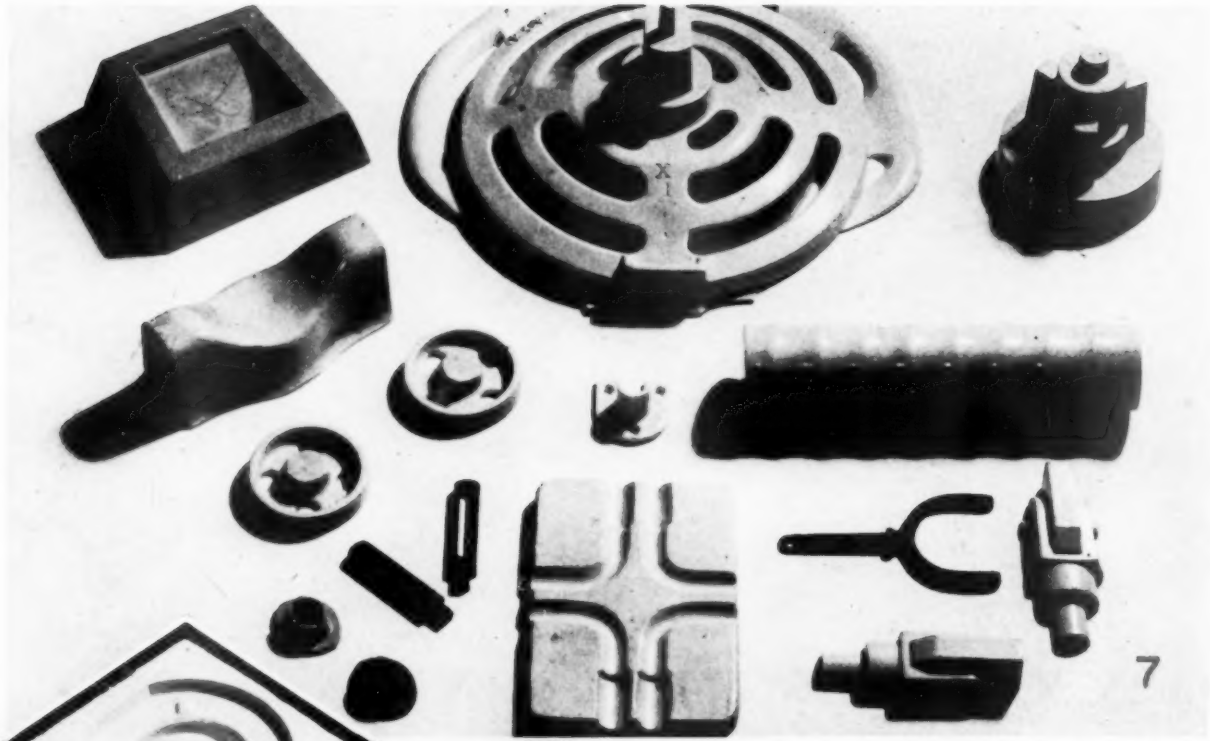


Fig. 7—Illustrating variety of size and design of patterns made from phenolic casting resin

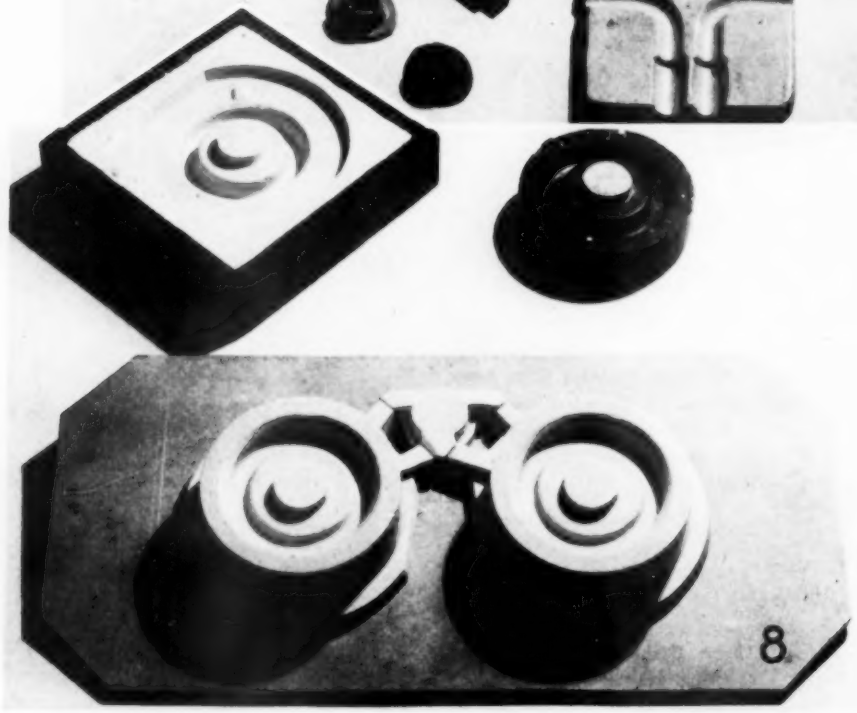


Fig. 8—Original wood pattern (upper right), phenolic casting resin sand core mold (upper left), and duplicate cast resin patterns mounted on a metal plate

terns having compound parting lines (not flat-parting) and which cannot be mounted but must be cast in one piece, the use of phenolic casting resin will result in lower cost patterns. Almost no finishing costs are encountered. The pattern comes from its mold with a smooth surface, close dimensional tolerance, and practically ready to use.

Cast resin patterns offer an advantage in requiring no special conditions while in storage. They are not affected by temperature or atmospheric change, do not absorb moisture, are dimensionally stable. When wood patterns chip or show wear they must be rebuilt or replaced. While cast resin patterns may be chipped, they may easily be patched and sanded but require no finishing such as shellacking or painting.

Having these several advantages, phenolic cast resin patterns seemed "naturals" for a wide variety of foundry pattern work. As their use for flat-backed and unmounted patterns expanded, they were tried for matchplate work. They were found lacking in strength for such use unless the sand was hand-rammed. Since this method today is too limited, experiments were undertaken to build into the cast resin plates adequate strength to permit their use with hydraulic ramming, or pneumatic ramming.

Four major factors which had to be considered in adapting the phenolic resin to matchplate work were compressive strength, flexural strength, impact strength and hardness. It was found that the casting resins now available from several plastics manufacturers have adequate compressive strength for such use, even without incorporating reinforcement or strength-increasing fillers. Furthermore, it was found that most manufacturers did not recommend the use of fillers because of the considerably greater care which is required in preparing the original resin mix and in the actual handling of this mix. Compressive strength figures given for the average standard material are all in the neighborhood of 15,000 psi. Some run as low as 12,000, while others are as high as 18,000, but the middle seems to be a fair average.

Unfortunately, flexural strength of these resins is rather low for matchplate work. The average figure given is 11,500 pounds psi. Therefore, it was found necessary to reinforce the casting resin for use in match plates. Simply reinforcing the resin plate still did not suffice, so Atlas Plastic designed a rather simple metal frame

(*Concluded on page* 126)

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(*Concluded from page* 124)

which not only serves to protect the edges and corners of the cast resin plate, but also adds further reinforcement and increases the tensile strength of the pattern as a whole. This channeled metal framework is placed in the form into which the casting resin is poured. It literally becomes an integral part of the plate. Although it would be possible to pour the cast resin pattern and later add the metal frame, this method is not so economically practical.

Impact strength figures given by the resin manufacturers range from .21 to .25 ft-lb per inch of notch. These figures are calculated by the ASTM standard Izod test. This impact strength is fully adequate for match plate patterns. The Rockwell hardness of the resins seems to be about 115 (R Scale). This, too, is adequate.

The experimental and development work by Atlas Plastics has very definitely advanced and enlarged the application of liquid phenolic casting resins for foundry patterns. The accompanying illustrations show to a partial extent the scope of pattern work produced by them the last few months. Figs. 3 and 4 show front and back of metal plate on which the cast resin patterns have been mounted. Gating is also in the resin, although it was cast separately and machined to fit.

Fig. 8 shows the original wood pattern (upper right), a phenolic casting resin sand core mold (upper left), and duplicate cast resin patterns mounted on a metal plate. A small cast resin piece to serve as a gate is mounted on the under side of the plate at the center of the sprue.

Fig. 7 illustrates the versatility of the phenolic casting resin from the standpoint of size and design. Almost any conceivable shape is readily produced in the casting resin. The slightest detail in the original mold is faithfully reproduced.

Figs. 5 and 6 illustrate another matchplate made from Durez casting resin. This is for an entirely different type of metal casting than that shown in Fig. 1 and 2.

For those not acquainted with these phenolic casting resins, a few facts regarding the production procedure may be of interest. The production of patterns from casting resins is relatively simple, but it does require a certain amount of technical skill just as is required in the production of any engineering job.

Among the several resins now on the market there are some slight differences. Consequently, production procedures may vary somewhat. Basically, the differences affect preparation of the resin mix and curing time. Therefore, in order to outline briefly such production one manufacturer's product has been selected as exemplary. The resin selected is a phenolic thermosetting resin in liquid form with which an accelerator is used to precipitate reaction. This material can be cast in simple molds without the use of pressure.

Common practice in making foundry patterns is the use of plaster molds. A grade of superfine casting plaster is required. The mold, which must be thoroughly dry, is coated with paint, such as Tygon Black, then usually with an additional mold lubricant of wax in some form. When the mold has been painted, allowed to dry thoroughly and waxed, the casting resin is mixed with the desired percentage of accelerator and poured. The casting is allowed to stand for three or four hours, depending upon the volume of resin used. It is then oven-baked for eight hours at 140 F.

The cast resin pattern is practically ready for use upon removal from the mold. Very little finishing, other than grinding off the mounting surface, is required. In the event some finishing touches are necessary, standard machine shop equipment may be used. In general, high speeds and light cuts are best. Fine-grain sandpaper and slow operating speeds permit the use of regular wood-sanding equipment.

Durez 7421A casting resin may be used not only for duplicating patterns, original patterns, matchplates, and molds, but also for drill and assembly jigs or fixtures, for models, electroplating shields, masking fixtures, dies for forming light metals, and pantograph patterns.

PROBLEMS IN MELTING
Discussed by Gas Association

LIVELY interest in foundry melting practice was revealed by technical speakers at the 28th annual convention and exhibition of the American Gas Association at the Municipal Auditorium, Atlantic City, N. J., Oct. 7 to 11. Discussions indicated not only advancement in technique and development of industrial heating units, but also well set-up plans for further progress. The convention program was well balanced and focused attention to practically every phase of the gas industry.

Karl Emmerling, general sales manager, East Ohio Gas Co., Cleveland, was elected chairman of the association's Industrial and Gas Section, succeeding Harry A. Sutton, assistant general industrial fuel representative, Public Service Electric & Gas Co., Newark, N. J. Leon Ourusoff, manager of utilization department, Washington Gas Lighting Co., Washington, D. C., was elected vice chairman.

In his report for the past year, the retiring chairman, Mr. Sutton, said that the Non-ferrous Metals Committee is preparing a handbook entitled "Standard Practices for Melting." These standard practices, he said, will emphasize the selection of gas equipment, proper adjustment and maintenance, as well as provide detailed recommendation in melting methods suitable for various metals and castings made from them.

This committee, he continued, is also investigating the performance of existing types of melting equipment; and in this connection is planning to prepare papers for presentation to the American Foundrymen's Association and to the technical press. Studies, too, are under way covering the completely enclosed spherical aluminum melters, the two-crucible reversing heat flow brass melter, and a new type of reverberatory furnace.

The committee on heat treating and tempering is expecting to bring out shortly a letter on "Interrupted Quenching" to be followed later by letters on "Alloys for Heat Resistant Uses," "Protective Coatings," "Temperature Control Systems," and "High Speed Heating for Hot-Forming Operations."

In a paper on "Recirculation as Applied to Heating and Cooling on Industrial Ovens," Richard J. Ruff, sales manager, Young Bros. Co., Detroit, said that the application of high volume air recirculation offers extensive advantages to those industries whose manufacturing processes include drying, baking or low temperature heat treatment.

Herman Gehnrich, vice president, Gehnrich & Gehnrich Inc., Woodside, L. I., in discussing "Ovens vs Furnace Construction for Temperature Up to 1200 F," declared that the panel-constructed oven "is here to stay," for work within that temperature range because of its demonstrated speed, economy and flexibility.

Standard brass melting practices leave much to be desired, W. Wirt Young, W. Wirt Young & Associates Inc., Waterbury, Conn., declared. However, he said there are many controversial factors on which more information will have to be developed before a real approach to the problem can be made. He said there are still controversial claims regarding the comparative porosity of brass poured from gas and oil-fired crucible furnaces.

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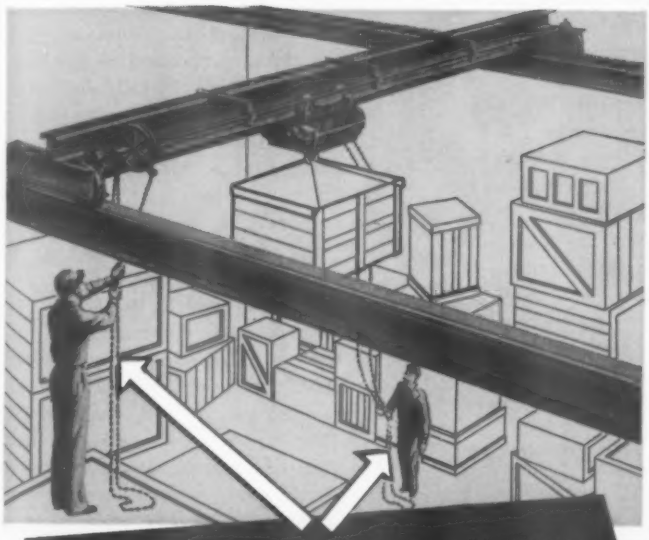
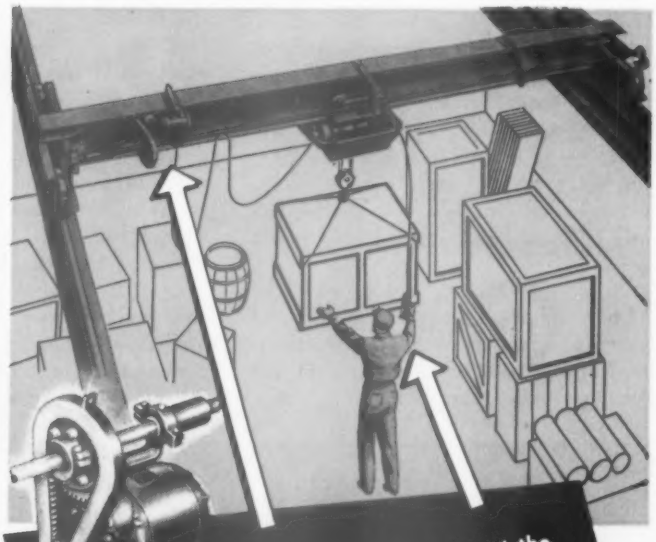


Without the Travelator an extra man has to pull on the travel chain as he climbs around boxes or other materials by the wall.



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Foundry Developments

By EDWIN BREMER

METHOD of keeping cupola tuyeres free of slag which was used with considerable success in Germany on continuously operating cupolas, is described in a report published by the Office of Publication Board, Department of Commerce, Washington 25 (PB-4353; photostat $1, microfilm 50 cents). Two rows of six tuyeres each are employed, with the windbox divided vertically into two chambers. Method of operation is to use alternate tuyeres in each row staggered—that is, if the upper row was numbered one to six and the lower A to F, the combination in use would be 1,3,5 with B,D and F or 2,4,6 with A,C and E. Change in the combination in use is made every 10 minutes, the tuyere valves being opened and closed by hand.

* * *

USE of filter cores to insure clean metal entering the casting cavity was developed by Brunelli in 1919 according to the *Foundry Trade Journal*, Sept. 12 issue. Brunelli apparently did not depend on the filter core alone, but used more or less complicated runner basins in addition. However, he did develop a table of recommended sizes of pencil runners and number to pour castings of various weights.

* * *

SEARCHING for a satisfactory method of cleaning aluminum in preparation for welding with the inert-arc process General Electric Co. engineers recently found that dips in sodium hydroxide and sulphuric acid produce mirror-bright, fine-contoured welds as welded. Procedure consists of a brief degreasing in a 5 per cent solution of sodium hydroxide to remove all grease, oil or wax, and a short wash in water to remove most of the caustic and scum. Then the aluminum is dipped in a 50 per cent sulphuric acid bath. That completes removal of the oxide skin and restores most of the surface brightness. A hot-water bath removes the acid and leaves the aluminum clean and dry. Welding tests made on samples cleaned by the method resulted in mirror-bright, fine-contoured beads as welded.

* * *

GALLIUM thermometer used in Germany for direct temperature readings up to 1200 C is described in a 12-page report of the Office of Technical Services, Department of Commerce, Washington 25. That type of thermometer often is used in Germany for measuring temperatures which otherwise could be measured only by thermocouples, disappearing filament pyrometers or other indirect means. Thermometer consists of a quartz capillary tube inside a quartz envelope. Capillary contains pure gallium with a slight trace of iron. The report containing a detailed diagram of the thermomenter is PB-25550; photostat $1; microfilm $1.

* * *

ALUMINUM and its alloys can be easily and quickly processed to produce lustrous, glossy finishes which are relatively hard and of good corrosion resistance, according to a recent report. Colors range from light gray through marbleized to light brown depending on timing and aluminum used.

* * *

INVERSE-SEGREGATION effects in magnesium alloys which interfere with the development of chromate films of normal color were investigated by R. J. M. Payne and the data published in the Aug. 1946 issue of the *Journal*, Institute of Metals (Great Britain). Payne found that the grain size of the material, rate of cooling in the mold, and the presence of thermal gradients are the main factors governing the appearance of these segregation effects. Use of coarse-grain metal, low casting temperatures and severe chilling are all conducive to the occurrence of inverse segregation. With sand castings and using the very fine-grain metal such as is obtained with normal melting, superheating, and casting practice, no significant inverse segregation is encountered.

With increasing grain size the tendency to segregation becomes more marked and with very coarse-grain material such as may be obtained by the addition of small proportions of beryllium, exudations of eutectic occur at the surface of unchilled sand castings. With gravity die-castings (permanent mold) the effects are similar, but the speedier cooling brought about by the use of a metal mold makes slight segregation difficult to avoid, even with fine-grain material. In segregating the aluminum generally is accompanied by other elements present as minor alloying additions or as impurities; silicon in particular which is present in the alloy as magnesium silicide, may be strongly segregated at the surface of the casting and make its presence manifest by its bright blue color.

Some of the operating executives of steel companies in the United States and Canada who witnessed tests on use of tonnage oxygen in the production of steel in the Hamilton, Ont., plant of the Steel Co. of Canada. Oxygen was introduced into the furnace to produce a controlled flame directed at the charge during the melt down period. No apparent effect on furnace lining was noted. Tests already conducted have proved that scrap melting time can be reduced substantially, and there seems to be little doubt that production of existing furnaces can be stepped up appreciably with no expenditure for extra capital equipment. (Photo Air Reduction Sales Co.)

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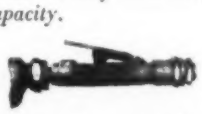

Lever Throttle—*instant power cut-off when lever is released. Automatic action makes this throttle preferred on hazardous operations.*

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PRESSURE-TIGHT PHOSPHOR BRONZE CASTINGS

(*Continued from page* 67)

the furnace atmosphere over the crucible showed an oxidizing atmosphere which is desirable for bronze castings. The gas had the following composition by volume: Carbon dioxide 13.7 per cent; oxygen 5 per cent; no presence of illuminants, carbon monoxide hydrogen, methane or ethane; and 81.3 per cent (by difference) of nitrogen.

Microscopic examination of porous bronze castings did not reveal any clues as to the cause of the porosity. X-ray examination showed slight porosity in internal sections of the castings.

Experimental Tests—After consideration of the melting conditions under which porous bronze castings were produced, it was decided that the porosity was due to the evolution of gases dissolved in the molten metal and liberated on solidification. A survey of the literature indicated that hydrogen is soluble in molten copper and copper base alloys and less soluble in the solid metals. The prevailing opinion in the literature is that hydrogen is the most harmful gas in decreasing the soundness of bronze castings. Therefore, means were required to minimize the amount of hydrogen in the molten bronze.

Try Three Methods

Three methods were tried for the elimination of gases from the molten bronze. Each method consisted of oxidizing the molten metal by the addition of oxygen and finally removing the oxygen before pouring, by the addition of 10 per cent phosphor copper. Two methods involving the addition of oxygen, one as cupric oxide and the other by the use of an oxidizing atmosphere with no charcoal cover, gave unsatisfactory results. The following method, adopted from the paper, "The Removal of Gases from Molten Bronzes," by W. H. Baker and F. C. Childs, published in the *Journal* of the Institute of Metals, August, 1944, in which excellent results on bronze pressure castings were obtained using a flux of 50 per cent copper oxide and 50 per cent potassium nitrate, was finally selected as satisfactory for production purposes:

Under an oxidizing atmosphere with no charcoal cover, virgin metals are alloyed in the following order to produce the alloy tested:

1. Melt copper (Grade A, Navy Department Specification 46C5).

2. Add 1 lb potassium nitrate per 100 lb melt.

3. Add zinc (Grade A, Federal Specification QQ-Z-351).

4. Add tin (Navy Department Specification 46T1d).

5. Add lead (Grade A, Federal Specification QQ-L-171) if required.

6. Deoxidize with 4 oz 10 per cent phosphor copper per 100 lb melt before pouring.

From each experimental heat the following castings were poured to determine the effect of the oxygen and reduction method employed: One flask tension test bars, shown in Fig. 3; and two Hi-Hat specimens[1], shown in Fig. 2, to test the porosity of the cast metal.

The tension test bars were machined to the dimensions of Type 1 tension test specimen, Navy Department General Specification for Inspection of Material, Appendix II, Metals, Part A. The Hi-Hat specimens were machined to a ⅛-in. thick Hi-Hat composed of the center portion of the cast specimen. The machined Hi-Hat specimen was subjected to air pressure introduced through the opening of the hat by means of a gasket covering the opening and having a nozzle for the application of air pressure. The Hi-Hat was placed under water and the air pressure applied. The amount of porosity in the Hi-Hat was revealed by the bubbles formed by air escaping through the Hi-Hat into the water.

One experimental heat of phosphor bronze (46B5, Grade I) was made by the oxidation and reduction method using potassium nitrate and phosphor copper. The following test results were obtained:

Heat No.	Tensile Strength, psi	Elongation, % in 2 in.
Required 46B5		
Grade I	35,000 (Min.)	18 (Min.)
7250 S	53,500	64.0
7250 S	52,500	54.0

Two machined Hi-Hat specimens showed no porosity under 50 psi air pressure, the maximum pressure applicable under the experimental set-up.

Because of the urgent need for pressure-tight castings for optical parts at the time, and the excellent results obtained on the experimental heat of phosphor bronze (46B5, Grade I), the oxidation and reduction method using potassium nitrate and phosphor copper was immediately used to make production pressure bronze castings with excellent results. Heat No. 8341S, made by the new method, produced four sound castings out of four cast where the former method gave 15 leakers out of 15 cast. In all cases, pressure castings formerly found porous when made by the old method, were made sound by the new method. The superiority of the adopted method over the old method is clearly shown by comparison in the accompanying table of the test results from 100 heats of phosphor bronze sand castings (Navy Department Specification 46B5, Grade I), made by the oxidation and reduction method, and 100 heats of the same composition, made by the old method.

COMPARISON OF METHODS

	Oxidation and Reduction Method	Old Method
Average tensile strength, psi	50,165	43,350
Average elongation, % in 2 in.	51.9	34.3
Number of heats with tensile strengths over 50,000 psi and elongations over 45%	76	8
Number of heats with tensile strengths above 48,500 psi and elongations over 40%	91	17

The physical properties obtained by the old method are spread over a wide range; those obtained by the new method are spread over a narrower range and show more consistency.

Figs. 1 and 4 are x-ray photographs of bronze castings made by the oxidation and reduction method and the general method, respectively. The bronze casting shown in Fig. 4 was fully machined and leaked on application of air pressure. The bronze casting shown in Fig. 1 did not leak after machining and application of air pressure.

The scrap and ingots from heats made by the oxidation and reduction method using potassium nitrate and phosphor copper were remelted without the use of potassium nitrate under an oxidizing

(*Concluded on page* 134)

[1]Hi-Hat specimen used by J. W. Bolton and S. A. Wiegand, *Transactions*, AIME, I. M. D. (1929), p. 475.

Comparison of Properties Obtained on Ounce Metal Castings

General Method			Oxidation—Reduction Method		
Heat No.	Tensile strength, psi	Elongation, % in 2 in.	Heat No.	Tensile strength, psi	Elongation, % in 2 in.
Required 46B23d	30,000 (Min.)	20 (Min.)	Required 46B23d	30,000 (Min.)	20 (Min.)
7112R	25,000	14.0	6021S	36,700	28.0
7252S	27,500	14.2	7251S	37,750	31.5
7147R	31,000	20.5	8340S	34,500	27.0
7222R	32,000	25.5	1802T	38,000	33.0

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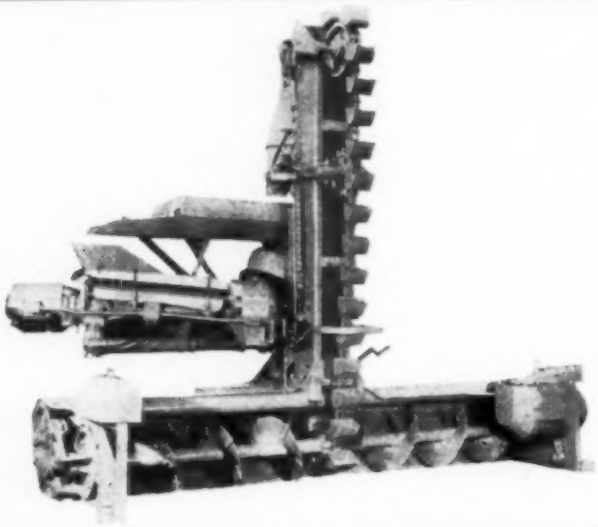
Stationary Sandslinger — for fast, accurate, uniform ramming of a variety of molds from repetitive patterns.



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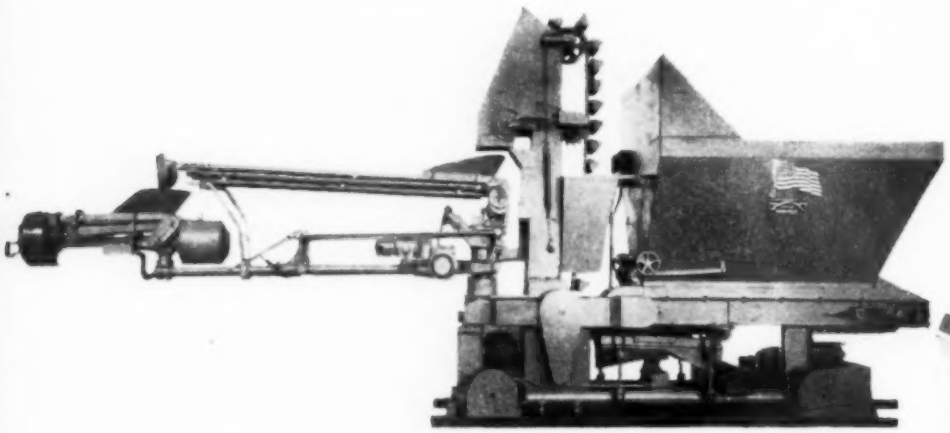

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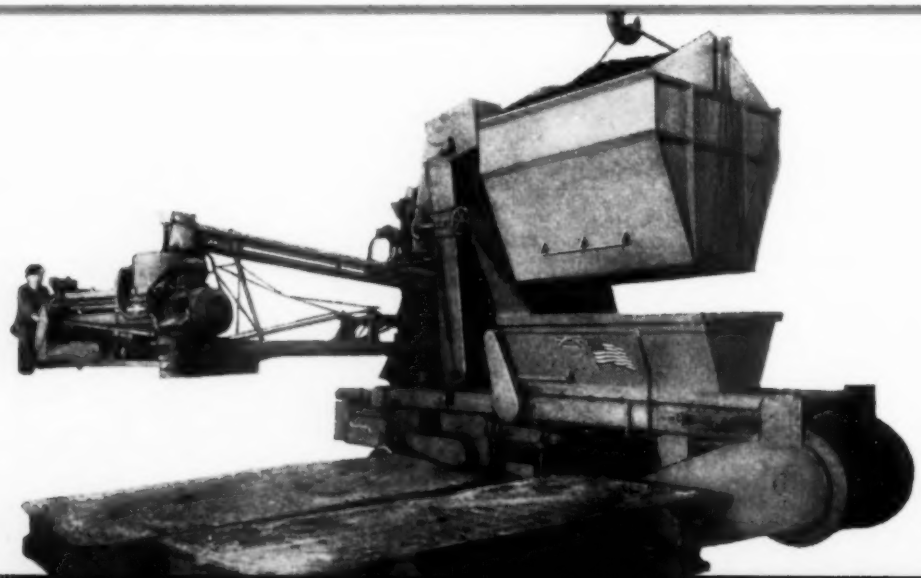
Motive Jr. Sandslinger — a specialty for jobbing foundries — quickly rams various sizes of molds as it travels up and down foundry bay on narrow gauge track carrying its own sand supply.

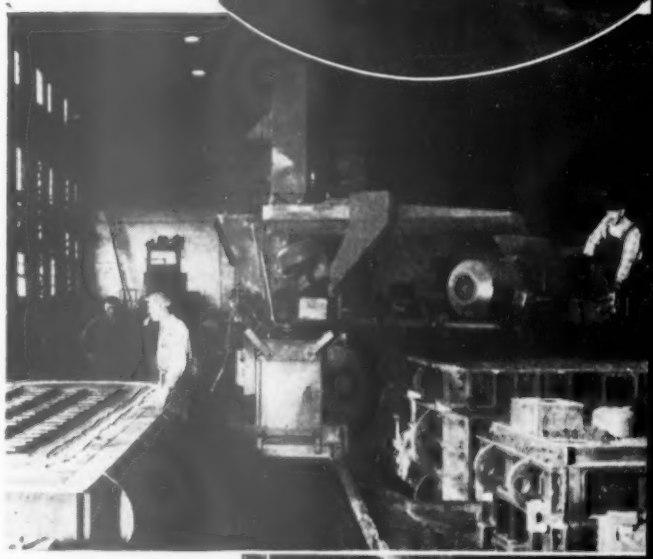


Speedslinger — fastest, most efficient ramming unit — operator rides the head, directing every function through centralized control.

Sandslinger

HERE'S THE RESULTS OF A SANDSLINGER AT THE PRESCOTT COMPANY'S FOUNDRY

Views of Prescott's "Slinger." Two 10-ton detachable sand hoppers keep this machine in constant operation.



Ramming efficiency . . . the "Slinger" has it! At The Prescott Co., Menominee, Michigan, their Motive Jr. Sandslinger can ram a mold (*19'* x *11'*—*46"* drag, *12"* cope) in 10 hours using 3 men (including set-up, securing and ramming, and pattern drawing time). To ram this mold by hand would take 4 men (*2* molders and *2* helpers) at least 24 hours to perform the same operations.

There's a size and type of Sandslinger for every foundry . . . large or small. B & P Engineers will advise you as to the type best suited to your foundry's requirements. Speed-up production . . . lower costs! Write now!

Pit mold (7'x13'—12" cope, 7' drag) rammed by "Slinger" in 10 hours. Hand ramming would have taken 24 hours. In addition to their great speed, "Slingers" ram the sand hard and uniformly.

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MAN-TO-MAN
on the Molder's Bench

"Showing Off"

By RALPH L. LEE

AS LONGFELLOW'S village smith stood under the spreading chestnut tree flexing the muscles of his brawny arms, I'll betcha he frowned a bit as the village kids pestered him with a lot of darned-fool questions. I have often thought that even though the smith showed all the earmarks of not wanting to be bothered, way down inside he must have felt a certain amount of pride in knowing that the kids as young as they were, together with other adult hanger-on-ers, admired him for the way he made hot steel do tricks.

Then too, I've often thought that the steam shovel operator, in spite of his dead-pan expression, wouldn't like his job quite as much if he couldn't see out of the corner of his eye his gallery of loafers silently applauding him for the tune he plays so skillfully on his lever keyboard.

When you stop to think of it, a large part of the pay we get from success in any line is in the form of applause from others who see us do what they know they can't do.

The other day, with some time to spend between trains, I dropped in on a little gray iron foundry. It was a job shop in every sense of the word, with castings ranging from one pound to a ton and in quantities that varied even more. The boss was so busy he turned me loose on my own, so I wandered from spot to spot watching the boys.

Although he pretended not to see me watching him, I know the cupola tender did, for he put on an extra flourish or two for my benefit. The iron didn't look any too hot to my inexperienced eye and by some sort of magic he must have sensed my doubt, for as soon as he could get to me he said, "It's a hell of a shame the kind of coke those blankety-blankety sons of sea cooks are sending me nowadays—just come over here and take a look at the stuff." I asked him whether he thought he would be able to manage and he said, "Well, I haven't let them down yet and there's a few tricks left in the old boy yet." I noticed that he perked up considerably when he could see that I knew enough about his problem to appreciate his confidence in himself and his know-how.

A bench molder, and not a spring chicken by any means, went right on working just as though I wasn't there watching him. I noticed that he tapped sort of an ice pick into the upper half of a split wooden pattern and rammed it up in the cope. I thought maybe he was going to rap his pattern through the sand with it, as I couldn't see any signs of air or vibrator. But he didn't; he shoved a little split wedge between the top of the cope and the under side of the ice pick handle, so when he lifted the cope the upper half of the pattern wouldn't drop out on him. Now this trick may be as old as the hills, but to me it was brand new and I told the molder so. He looked kind of embarrassed and mumbled something about not enough bond in the sand, but I could see that he was considerably perked up because I had learned something from him and admired the way he went about his work. I almost missed my train that night, for there were so many places I had to stop and watch the fellows work.

As I walked out with the boss, it seemed to me that almost every one I had met waved good-by, and those I didn't meet waved too. I guess the old grapevine got the news around about my foundry hobby and my admiration of foundry skills.

Anyway, I know for a fact that the boys in that little foundry were in darn sight better spirits when I left than when I came, and the only thing I can lay it to was that they had a chance to show off a bit, even though it was only before a one-man audience. Maybe too much hiding of the old light under the bushel isn't such a good thing. At least I'm pretty much convinced that every one, whether he admits it or not, likes to show off a bit and a chance to do it once in a while. Maybe we ought to have more visitors through our foundries, or at least leave the doors open so the village kids can admire the molders flex the muscles of their brawny arms. If this can't be arranged, then maybe the big boss might pretend he was a visitor once in a while and take an admiration trip down through his place, and you can't tell, even he might learn something at that.

(*Concluded from page* 131)

atmosphere with no charcoal cover, and the physical properties and quality of the castings were equal to those obtained from the original heats. The use of potassium nitrate on scrap and ingots of phosphor bronze (46B5, Grade I) was tried and gave poor physical properties and porous castings.

The oxidation and reduction method using potassium nitrate and phosphor copper was tried in the manufacture of some ounce metal sand castings (46B23). Physical properties of the castings made were slightly higher than those obtained by the old method and the castings showed the same improvement in porosity quality as found with phosphor bronze castings. A comparison of physical properties obtained on ounce metal castings made by the general melting procedure and the oxidation-reduction method is given in the accompanying table.

Acknowledgement—The writers gratefully acknowledge the co-operation of J. E. Crown, master mechanic; E. J. Bush, quarterman; P. O. Ady, leading man and the workers of the U. S. Naval Gun Factory, Washington. Acknowledgment is also due to Lewis H. Fawcett, principal metallurgist, U. S. Naval Gun Factory, for his direction and advice given during the course of the investigation.

NO. 2 ROYER INSTALLED BY MADISON BRASS WORKS, INC.

This Wisconsin foundry installed its first Royer Sand Conditioner years ago, and recently purchased the Royer pictured—to produce properly conditioned sand for the production of quality brass, bronze, and aluminum pressure castings.

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Royers are so widely used because they solve the sand preparation problem easily and quickly by providing correctly conditioned sand at minimum cost. One man with a Royer can prepare enough sand, in a few minutes, to keep a crew of molders busy for hours.

Only Royers provide Six Point Sand Conditioning:

1. The automatic removal of contamination.
2. Reducing the sand to a smooth, even texture; free of lumps.
3. The proper blending of old sand, new sand and bond.
4. The correct distribution of moisture.
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6. Double aeration; once on the belt and again as the sand is being discharged.

There is a Royer model, stationary or portable for every foundry requirement, including the Royer Combination Scrap Removers and Sand Separators and Blenders, with capacities of up to 50 tons of prepared sand per hour.

Look in your sand heap for lower costs and greater profits. Write for Catalog 44 on Royer Sand Conditioning Equipment.

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Simplicity of design is more than an expression. It means real advantages, such as lower initial cost, faster operation, lower maintenance and down-time, increased earning ability. SPO has specialized from the beginning in building simpler and still more simple equipment, with correspondingly greater profit possibilities for the purchaser.

Consider the SPO No. 100 Series (two types pictured). These jolt squeeze machines, air-operated, excel for matchplate and gated pattern work. Being "ABC" in design, they are easy to operate and easy to keep operating. Moving parts? Very few—and those fully guarded against two enemies, sand and grit. The open-end squeeze head accommodates extra long flasks.

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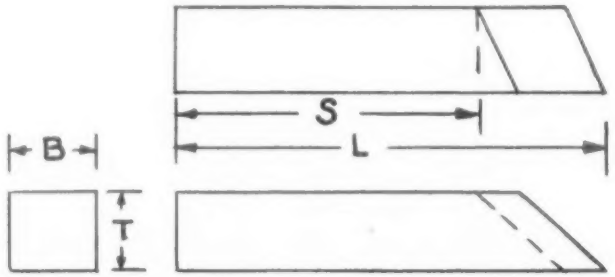
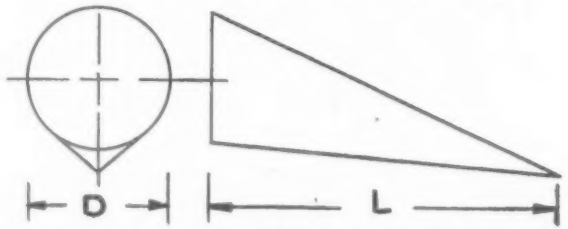
FORMULAS FOR DETERMINING THE WEIGHTS OF CASTINGS

(Continued from October)



To find the weight of a truncated rectangular casting, multiply the thickness of the base by its breadth, by the sum of the longest and shortest lateral edges, by one-half of the weight per cubic inch of material used. (See C in Table I, page 135, September issue).

$$W = T\,B\,(S + L) \times \tfrac{1}{2}\ \text{Wt. per cu. in.}$$



To find the weight of a cone, multiply the diameter squared by the length, by the constant, K, corresponding to the weight per cubic inch. (See Table VI).

$$W = D^2LK$$

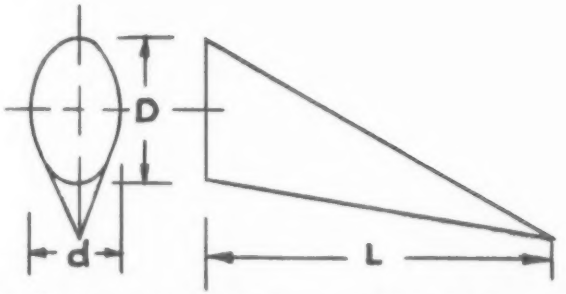
Table VI

Wt. per cu. in.	K	Wt. per cu. in.	K	Wt. per cu. in.	K	Wt. per cu. in.	K	Wt. per cu. in.	K	Wt. per cu. in.	K
.096	.0251	.170	.0445	.250	.0655	.330	.0864	.410	.1073	.490	.1283
.100	.0261	.180	.0471	.260	.0681	.340	.0890	.420	.1100	.500	.1309
.110	.0288	.190	.0498	.270	.0707	.350	.0916	.430	.1126	.510	.1335
.120	.0314	.200	.0524	.280	.0733	.360	.0943	.440	.1152	.520	.1361
.130	.0340	.210	.0550	.290	.0759	.370	.0969	.450	.1178	.530	.1388
.140	.0367	.220	.0576	.300	.0785	.380	.0995	.460	.1204	.540	.1414
.150	.0393	.230	.0602	.310	.0812	.390	.1021	.470	.1231	.550	.1440
.160	.0419	.240	.0628	.320	.0838	.400	.1047	.480	.1257	.560	.1466

Interpolation Table

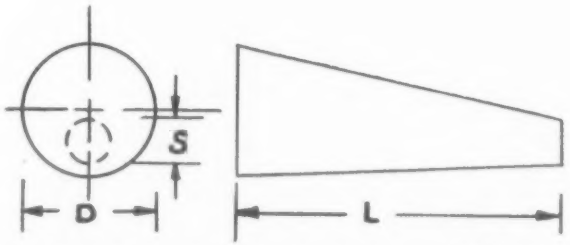
Add'l wt.	Add'l K	Add'l wt.	Add'l K	Add'l wt.	Add'l K
.001	.0003	.004	.0010	.007	.0018
.002	.0005	.005	.0013	.008	.0021
.003	.0008	.006	.0016	.009	.0024

For method of interpolation see Table II, page 136, September issue.



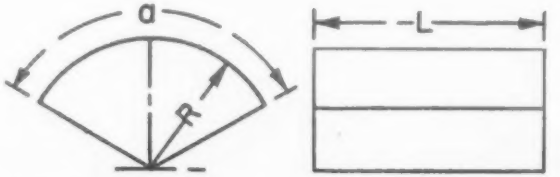
To find the weight of an elliptical cone, multiply the large diameter of the base by the small diameter, by the length, by the value of K. (Table VI).

$$W = DdLK$$



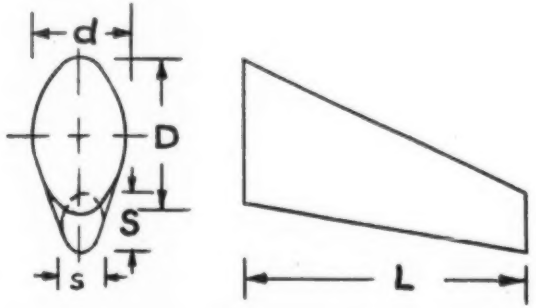
To find the weight of a frustrum of a circular cone, multiply the sum of the diameter of the large base squared, the diameter of the small base squared and the product of the two diameters by the length, by the value of K. (Table VI).

$$W = (D^2 + S^2 + DS)LK$$



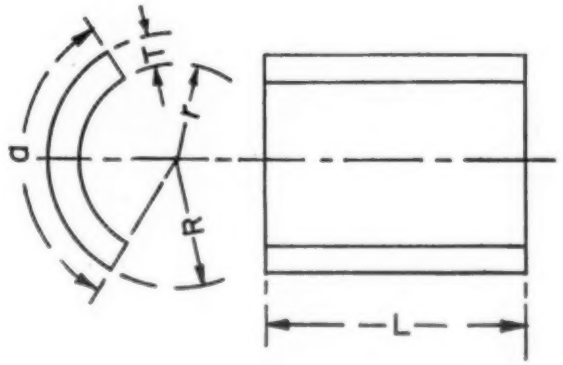
To find the weight of a sector of a solid cylinder, multiply the radius squared by the length, by the number of degrees in the angle, by the constant, M, whose value is indicated in Table VII.

FORMULAS FOR DETERMINING THE WEIGHTS OF CASTINGS



To find the weight of a frustrum of an elliptical cone, first find the sum of the products of the large diameter of large base by its small diameter, the large diameter of the small base by its small diameter and the large diameter of the large base by the small diameter of the small base; then the required weight is the product of this sum by the length by the value of K. (Table VI, page 137).

$$W = (Dd + Ss + Ds)LK$$



To find the weight of a sector of a hollow cylinder, multiply the sum of the inside radius and one-half of the thickness by the thickness, by the length, by the number of degrees in the angle, by the constant, m, corresponding to the weight per cubic inch. (See Table VII).

$$W = (r + T/2)\ T\ L\ a\ m$$

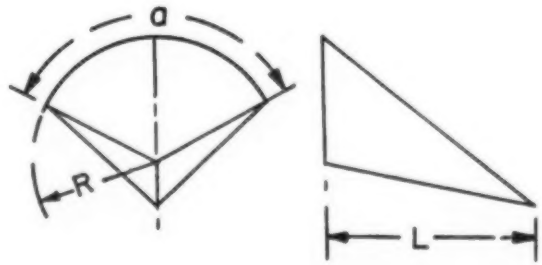
Table VII

Wt. per cu. in.	M	m	C	Wt. per cu. in.	M	m	C	Wt. per cu. in.	M	m	C
.096	.00084	.00168	.000279	.250	.00218	.00436	.000727	.410	.00358	.00716	.001193
.100	.00087	.00175	.000291	.260	.00227	.00454	.000756	.420	.00367	.00733	.001222
.110	.00096	.00192	.000319	.270	.00236	.00471	.000785	.430	.00375	.00750	.001251
.120	.00105	.00209	.000349	.280	.00244	.00489	.000815	.440	.00384	.00768	.001280
.130	.00113	.00227	.000378	.290	.00253	.00506	.000844	.450	.00393	.00785	.001300
.140	.00122	.00244	.000407	.300	.00262	.00524	.000873	.460	.00401	.00803	.001338
.150	.00131	.00262	.000436	.310	.00271	.00541	.000902	.470	.00410	.00820	.001367
.160	.00140	.00279	.000465	.320	.00279	.00558	.000931	.480	.00419	.00838	.001396
.170	.00148	.00297	.000495	.330	.00288	.00576	.000960	.490	.00428	.00855	.001425
.180	.00157	.00314	.000524	.340	.00297	.00593	.000989	.500	.00436	.00873	.001455
.190	.00166	.00332	.000553	.350	.00305	.00611	.001018	.510	.00445	.00890	.001484
.200	.00175	.00349	.000582	.360	.00314	.00628	.001047	.520	.00454	.00908	.001513
.210	.00183	.00367	.000611	.370	.00323	.00646	.001076	.530	.00463	.00925	.001542
.220	.00192	.00384	.000640	.380	.00332	.00663	.001105	.540	.00471	.00942	.001571
.230	.00201	.00401	.000669	.390	.00340	.00681	.001135	.550	.00480	.00961	.001600
.240	.00209	.00419	.000698	.400	.00349	.00698	.001164	.560	.00489	.00978	.001629

Interpolation Table

Add'l wt.	Add'l M	Add'l m	Add'l C	Add'l wt.	Add'l M	Add'l m	Add'l C	Add'l wt.	Add'l M	Add'l m	Add'l C
.001	.00001	.00002	.000003	.004	.00003	.00007	.000012	.007	.00006	.00012	.000020
.002	.00002	.00003	.000006	.005	.00004	.00009	.000015	.008	.00007	.00014	.000023
.003	.00003	.00005	.000009	.006	.00005	.00010	.000017	.009	.00008	.00016	.000026

For method of interpolation, see Table II, page 136, September issue.



To find the weight of a sector of a cone, multiply the radius squared by the length by the number of degrees in the angle by the value of C.

$$W = R^2 L\ a\ C$$

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Activities of Foundry GROUPS

Chicago

CHICAGO Chapter of the Chicago AFA started off its 1946-47 season Oct. 7 with a dinner meeting at the Chicago Bar Association. Some 141 members and guests attended to hear E. L. Berry, vice president in charge of production, Link-Belt Co., Chicago, discuss "Job Evaluation."

The occasion was designated as "Past Chairmen's Night" to pay honor to those who have headed the chapter since its organization in 1934. Among the past chairmen present and the years in which they served were: James Thomson, works engineer, Continental Foundry & Machine Co., East Chicago, Ind., 1935-36; L. J. Wise, manager, Allied Steel Castings Co., Chicago, 1936-37; H. W. Johnson, vice president, Wells Mfg. Co., Des Plaines, Ill., 1937-38; L. H. Rudesill, metallurgist, Griffin Wheel Co., 1938-39; C. E. Westover, Westover Engineers, Milwaukee, 1939-40; M. F. Becker, M. F. Becker & Associates, Chicago, 1943-44; and A. S. Klopf, senior engineer, Lester National Founders' Association, Chicago, 1944-45.

Also present were Gottfrid Olson, who retired recently as foundry engineer, National Founders' Association, Chicago, and David G. Anderson, until recently foundry engineer, Hawthorne Works, Western Electric Co., Chicago, and Mr. Olson's successor in the National Founders' Association, both being past presidents of the Chicago Foundrymen's Club, predecessor of the Chicago Chapter, AFA.

Another feature of the meeting was the deferred presentation of the chapter's "Oscar," the past president's statuette, to J. C. Gore, Chicago manager, Werner G. Smith Co., who was president last year. President L. H. Hahn, metallurgical supervisor, Sivyer Steel Casting Co., Chicago, made the presentation, and in the absence of Mr. Gore it was received in his behalf by Past President Klopf.

Chapter Vice President Fred B. Skeates, foundry superintendent, Link-Belt Co., Chicago, presided at the technical session following dinner.

In his address on "Job Evaluation," Mr. Berry admitted that top management has "pulled many boners" in its handling of workers. Before a system can be installed, management must know what job evaluation is, what it is for, and what it will do. First it must sell its staff on what it has to sell to workers.

The speaker asserted that union co-operation must be gained, a common mistake being that management damns unions. At the same time, unions frequently look upon management as too static, negative and legalistic. Mr. Berry emphasized that management must have understanding and be basically honest. Workers want to have confidence in management.

A company's equity in manpower is more important than its equity in plant and product, Mr. Berry maintains. He presented a lengthy list of 25 factors which served to illustrate his point that there is much lack of understanding of job evaluation.—*Erle F. Ross.*

Birmingham

OVER seven hundred foundrymen and their friends attended the 13th annual outing and barbecue of the Birmingham District Chapter of the AFA at Roebuck Country Club, Sept. 14. J. M. Bates, Moore-Handley Hardware Co., was general chairman of the outing and was complimented by the members for the excellent way in which he handled the job. J. Frank Curry, ABC Coal & Coke Co., handled ticket distribution for the outing, and Charles B. Saunders, Woodward Iron Co., was sergeant-at-arms.

An athletic program planned by Gene Welchel, American Cast Iron Pipe Co., kept the fellows on the go from early morning until late in the evening. The program included golf, swimming, horseshoe pitching and a softball game. Sam Carter and Harry Mouat, captained the softball teams, "Foundrymen Giant Killers" and "Supplymen Giants." The "Killers" subdued the "Giants," 8 to 6, aided and abetted by the umpires and two home runs by Henry Holcomb Grubbs.

The menu included barbecued beef and pork, potato salad, slaw, pickles, sliced tomatoes, buns, iced tea and brick ice cream, with refreshments being served throughout the afternoon and evening. Fifteen prizes were awarded to holders of lucky ticket numbers. This proved to be a big attraction with "Ace Showman" Harry Mouat drawing the numbers and awarding the prizes. John Graham, Stockham Pipe Fittings Co., was photographer for the event.

Birmingham District Chapter officers for the coming year are: T. H. Benners, chairman; W. E. Jones, vice-chairman and program chairman; Fred K. Brown, secretary-treasurer. — *J. P. McClendon, publicity chairman.*

Cincinnati

A QUESTION-AND-ANSWER sand forum was featured at the Sept. 9 meeting of the Cincinnati District Chapter of the AFA, held at Engineering Society Headquarters, with 110 members and guests in attendance. Chairman Joseph Schumacher, Hill & Griffith Co., Cincinnati, presided at the meeting, which included representatives from Dayton, Hamilton, Lawrenceburg, Indiana and Cincinnati.

Speakers included Edward King, vice president and general manager, Hill & Griffith Co.; William Ball, superintendent, Magnus Brass Division, National Lead Co.; J. B. Caine, engineer, Sawbrook Steel Castings Co.; J. D. Judge, engineering department, Hamilton Foundry & Machine Co.; and Walter Klayer, chief engineer, Aluminum Industries Inc.

Active discussion involving the causes of rat tails, scabs, blows, etc., common to cast iron, nonferrous and steel sand conditions, were of interest to everyone present. The members were encouraged to ask questions and participation was general.—*E. F. Kindinger, secretary.*

New England

SETTING a new attendance record at its opening meeting for the 1946-47 season, the New England Foundrymen's Association gathered at the Engineer's Club, Boston, Sept. 11, for a round-table discussion on the subject of "How to Make Gray Iron Castings With Less Pig Iron."

Joseph Stazinski, General Electric Co., spoke on that company's foundry experimental work in which as little as 5 per cent pig iron was used in the mixture. He showed samples of castings made with the reduced pig iron mixes. Harold Judson, Standard Foundry, Worcester, Mass., related in detail the experience he had had on the subject. The meeting was then opened for discussion and those present related their experiences, especially regarding the use of carbon raising materials, late silicon additions, and chill test as a means of control. D. L. Parker,

(*Continued on page* 142)

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(*Continued from page* 140)

General Electric Co., acted as moderator and discussion leader.

At the beginning of the meeting, Howard Stockwell, Barbour Stockwell Co., Cambridge, Mass., reported on the work of a recently appointed pig iron committee.—*Merton A. Hosmer.*

Northern California

NORTHERN California Chapter of the AFA opened the 1946-47 season with a "Get Acquainted-Get Together" meeting Sept. 13 at the Engineer's Club, San Francisco. George McDonald, program chairman, organized an excellent program featuring a travel talk by James Francis, chapter member and recently associated with the Meehanite Corp. He talked about his trip to Mexico and South America where he worked in and with many foundries and had the opportunity to observe much of the beauty and customs of the countries in which he stayed. He showed a number of pictures which served as an outline for his talk.

President Richard Vosbrink announced the new committee chairmen for the coming term and introduced those present. Harris Donaldson introduced the new members: Arthur B. Morse, C. E. Beckett, Raymond R. Wimer and A. E. Weidenbacker, Gladding McBean Co.; L. L. Little, H. C. Little Burner Co.; Robert Grover, Palmquist Foundry; Davis Taylor, American Foundry Equipment Co. and Walter Berkley, Westinghouse Mfg. Co.

Mr. Vosbrink reported on the chapter presidents' meeting held this summer in Chicago from which he brought back many ideas for more extensive and integrated AFA programs for the West coast. The AFA national directors met at the same time and Samuel Russell, Northern California chapter director, reported on that meeting.

The AFA Regional Conference next spring will be arranged as part of the Western Metals Congress, sponsored by the American Society for Metals. Charles J. P. Hoehn, past president, 1937-38, has been appointed as chairman of the committee to organize AFA's participation in the congress. Milton Hystrom has been selected as chairman of the AFA Program Committee.

The death of members Alfred J. Snow and Louis Brisolese was regretfully announced.

Of unusual interest was the fact that there were five past presidents of the chapter present at this meeting: Charles J. P. Hoehn, 1937-38; Samuel D. Russell, 1939-40; Ivan L. Johnson, 1940-41; Jarry A. Bosse, 1943-44 and Ralph C. Noah, 1944-45.

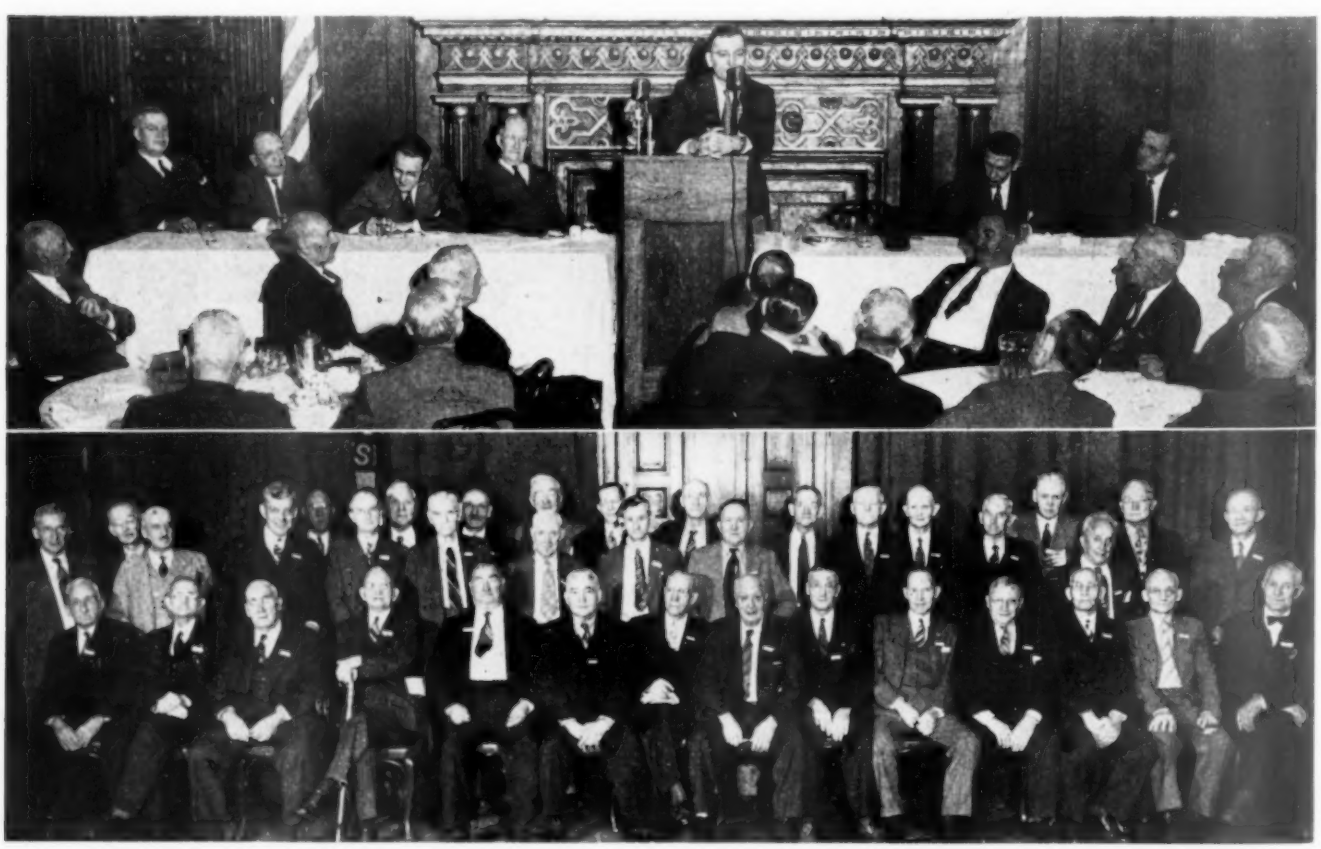
Guests present were: James L. Hall, American Manganese Steel Division, American Brake Shoe Co., and a Chicago Chapter member; Victor Hoaster, Clarkson Co.; Robert L. Mostus, Minnesota Mining & Mfg. Co.; Louis Marino, San Francisco Iron Foundry; Jack Brock, Chamberlain Co.; James Rimmer, Columbia Steel Co.; Morris Furtado, Vulcan Foundry Co.; Ralph E. Peter, Electro Metallurgical Sales Corp. and George Rezenido H. C. Macaulay Foundry Co. —*Charles R. Marshall, publicity chairman.*

Pittsburgh

OVER 200 attended the 50th anniversary dinner and meeting of the Pittsburgh Foundrymen's Association, held at the Fort Pitt Hotel, Pittsburgh, Sept. 17.

In commemorating its golden anniversary the association invited all those in the foundry industry for 50 years or more to be present at this initial meeting of the 1946-47 season. Nearly 40 of these "old timers," representing over 2000 years of service to the industry, were able to attend. In acknowledgment of their long period of service to the industry, lifetime membership cards in the association

(*Continued on page* 144)



OLD TIMERS: Lower picture shows a view of the "old timers" who were guests of Pittsburgh Foundrymen's Association at its 50th Anniversary celebration, Sept. 17. These men have been active in the foundry business since the inception of PFA in 1896. Upper picture shows speaker's table at the anniversary dinner

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(*Continued from page* 142)

were presented to this select group. Interesting sidelight of the special program involving these 50-year industry members was the reading of the minutes of the association's first meeting, held in July, 1896, which included the names of those in attendance and outlined the broad purpose and functions of the proposed organization.

J. H. Van Deventer, president of *The Iron Age*, was the principal speaker of the evening. Mr. Van Deventer pointed out that today we have higher total productivity than ever before, but lower individual productivity than at any time during the past 10 to 15 years. It takes about 50 per cent more man-hours to turn out an automobile today than it did before the war, he said, and unit productivity, measured in hourly or daily output per man, has slipped in almost every line of productive endeavor. Today we have the highest level of employment, the greatest potential demand backed by purchasing power, but individual productivity is weak.

Unit productivity is the most important factor in our economy, he stated. What we do with it will decide whether we are to continue to progress in making more goods available for more and more people or whether we are to move into a shrinking economy in which the dollar sign on the pay envelope will have lost its relationship to buying power.—*Joseph C. Sullivan.*

Western New York

REGULAR monthly meeting of the Western New York Chapter of the AFA was held Oct. 4, at Hotel Touraine, Buffalo, with 73 members and guests in attendance. Chairman Henry C. Winte presided and introduced new members as well as chairmen of standing committees who will direct various activities during the 1946-47 season.

Fred L. Weaver introduced the speaker of the evening, Clyde A. Sanders, American Colloid Co., Chicago, whose subject was, "Foundry Sand Practice." Mr. Sanders discussed synthetic and natural sands, comparing the qualities and advantages of each. He stressed that there are qualities in natural sand that have not been duplicated as yet in sand prepared synthetically. Laxity in foundry controls too often is responsible for casting losses, and the speaker pointed out how important it is to get the real facts, when one is in trouble, and not take someone's word for it. Frequently sand is blamed for casting losses, when upon careful examination and study, the cause of the trouble may be traced to use of too many gaggers, flasks with bars too close to the casting, worn closing pins, etc.

Sand density is another phase of sand control which the speaker covered at considerable length; there is a definite trend toward emphasizing the importance of this subject in sand preparation through use of graded sands. The talk was well received by members and guests and interest in the subject was demonstrated by the lively discussion period which followed.—*Leo A. Merryman, secretary.*

NORTHEASTERN OHIO: General views of the dinner meeting held by Northeastern Ohio Chapter of the AFA, Sept. 12, at which Ralph L. Lee, General Motors Corp. was guest speaker. Top right is view of speaker's table. (Photos courtesy Sterling N. Farmer, Sand Products Corp., Cleveland)

Twin City

OPENING meeting of the Twin City Chapter of the AFA for the 1946-47 season was held Sept. 19, at the Curtis Hotel, Minneapolis. Lester B. Knight, Lester B. Knight & Associates, Chicago, was guest speaker, and supplemented his talk, "Good Housekeeping in the Foundry," with slides showing various foundries before and after a mechanization program had been accomplished.

Some form of mechanization is possible today in every shop, for mechanization does not mean a large installation necessarily, but can be applied to any systematic application of power from pushing a broom to use of large power units. To utilize its advantages management must have good housekeeping methods in force to properly control materials, and through them the product itself. Mr. Knight stated that there is a definite relationship between the quality of castings produced and the degree that good housekeeping is practiced. Foundries can achieve a high production standard through good housekeeping and mechanization, without increasing the size of the foundry itself. Mechanical equipment does not guarantee a well-kept shop but its effectiveness depends on the common sense employed by management in its installation. The speaker believes that it is essential to provide better working conditions to prove that the foundry is a good place to work. In the present and future labor market, a clean shop, combined with well installed mechanical equipment, will be necessary to compete with other industries.

The chapter held its first annual summer golf party at Keller Golf Course, St. Paul, Sept. 11. A fine chicken dinner was enjoyed by 86 members and guests, after 65 or more had finished playing golf. Fred Junger tied with Dean Thom for a low score of 75. S. V. Wood, C. H. Loacht, E. C. Gustafson and Frank Blandin won blind bogey prizes. There

(*Continued on page* 146)

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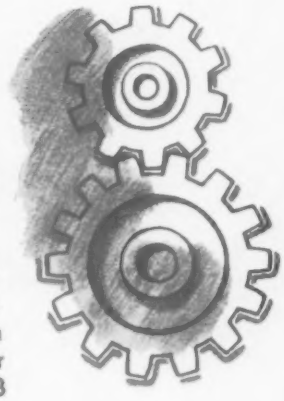

If you are pouring light sections and want good machineability, low hardness, and no chilled edges, add 2 lbs. of No. 8 Mexican Graphite to each ton of metal, or less, by trickling at the spout or tossing into the ladle while filling. At a cost of less than 10c per ton, No. 8 Mexican Graphite eliminates the need for annealing and reduces cleaning room and machine shop expense. Write for full information and metallurgical assistance in increasing profitable production in your foundry with Mexite Briquettes and No. 8 Mexican Graphite.

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(*Continued from page* 144)

were awards made of 61 door prizes. Dean Thom was chairman of the committee in charge of arrangements for the party, and he was assisted by I. F. Cheney, H. J. Flaaten, Carl Olson Jr., and T. H. Palmer—*J. W. Costello.*

Central New York

CENTRAL New York Chapter of the AFA opened the year's activities Sept. 13, with a dinner meeting at Hotel Langwell, Elmira, N. Y., when 112 members and guests heard Prof. J. Jeffrey, Cornell University, present the first of his series of talks on "Metallurgy." A short business meeting preceded the talk at which Chairman E. E. Hook, Dayton Oil Co., Syracuse, N. Y., presided.

Prof. Jeffrey explained the metallurgical terms "Composition of an Alloy," "Constitution of an Alloy," "Space Lattices," "Dendrites," "Solid Solution," "Chemical Compound," and the "Equilibrium Diagram." He supplemented his talk with motion pictures.

Following the lecture a round-table discussion took place. W. G. Parker, chief metallurgist, Elmira Foundry Co., Elmira, N. Y., was discussion leader for the gray iron group. William Meader, chief metallurgist, Oberdorfer Foundries, Syracuse, N. Y., headed the nonferrous discussion. D. J. Merwin, Oriskany Malleable Iron Co., Utica, N. Y., and N. Paul Benson, Frazer & Jones Co., Syracuse, N. Y., handled the malleable section. This type of meeting proved very popular with those who attended and a similar meeting will follow later.—*J. A. Feola, publicity chairman.*

Texas

THE Texas Chapter of AFA inaugurated its 1946-47 season with a dinner meeting at the Golforest Country Club, Houston, Sept. 27. Chapter Chairman W. M. Ferguson, Texas Electric Steel Casting Co., Houston, was toastmaster to 47 attending members and guests.

Bruce Layer, *Houston Post* sports writer, gave a coffee talk, "Football Prospects for the Southwest Conference." His predictions and comments were of genuine interest. Chapter Director DeWitt McKinley, McKinley Iron Works, Fort Worth, briefly outlined recent efforts made to get relief on allocation of pig iron to iron foundries.

A technical paper, "Fundamentals of Foundry Metallurgy," was presented by W. H. Lyons, metallurgical engineer, Hughes Tool Co., Houston. His talk was supplemented with slides and an exhibit of a small steel casting with open riser attached. The sample was sectionalized to show the successful use of a break-off riser made in green sand.

Representing new members at the meeting were W. L. Heirman and H. T. Speer, Tips Engine Works, Austin, and M. J. Henley, Texas Foundry Co., Lufkin, whose membership was transfered from the Birmingham District Chapter. Vice president L. H. August, Hughes Tool Co., Houston, announced plans for roundtable discussions by the chapter's different foundry groups to be held at a future meeting.—*R. H. Glenney, publicity chairman.*

ST. LOUIS: Speaker's table and general view of the season's first dinner meeting of the St. Louis District Chapter, AFA

St. Louis

FIRST meeting of the St. Louis District Chapter of the AFA for the 1946-47 season was held at the Desoto Hotel, St. Louis, Sept. 12. Considerable advance interest in the meeting had been indicated by reservation cards and the turnout of 105 members and guests justified hopes of the board of directors that this would be a good meeting and a fine indication of interest in the chapter's activities for the coming year.

Principal speaker of the evening was E. H. Schleede, development engineer, United States Gypsum Co., who outlined processes in plaster pattern making. Mr. Schleede supplemented his talk with a number of pictures. A lively group discussion followed the talk.

Acting Chairman Norman Peukert stated that Eugene Ballard was leaving National Bearing Metals, St. Louis, to join Lester B. Knight & Associates, Chicago. Mr. Ballard is a past chairman of the chapter and for many years had a keen interest in its activities.—*John W. Kelin, publicity chairman.*

Central Indiana

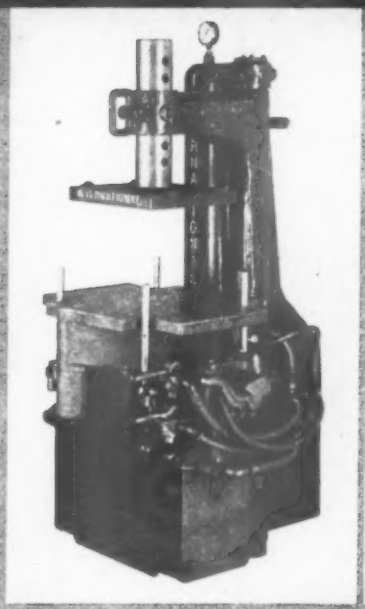
TWO guest speakers high-lighted the first dinner-meeting of Central Indiana Chapter's 1946-47 season. Ninety-four members and guests turned out to eat a roast turkey at the Antlers Hotel at 6:45 p.m. The meeting was called at 8.

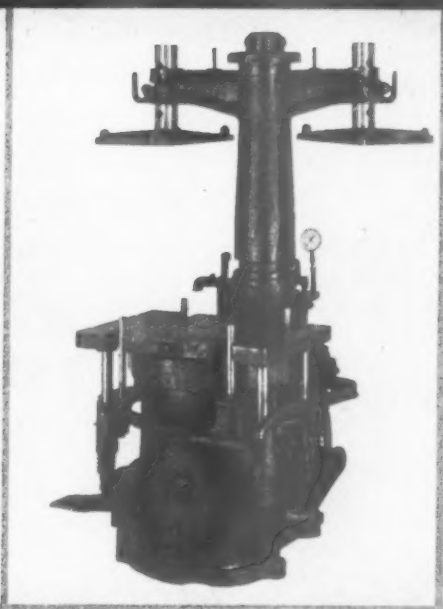
George Applegate of the Indiana Manufacturer's Association led a short discussion on the Indiana Foundry Code as prepared by the Indiana State Department of Labor.

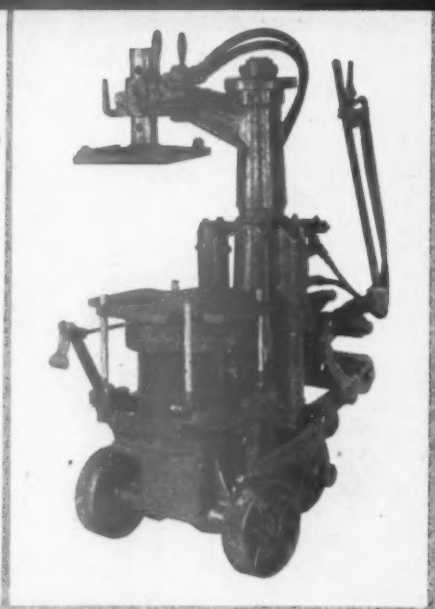
"Safety in the Foundry" was the main topic of the evening. It was presented by

(*Continued on page* 148)

INTERNATIONAL MOLDING MACHINES







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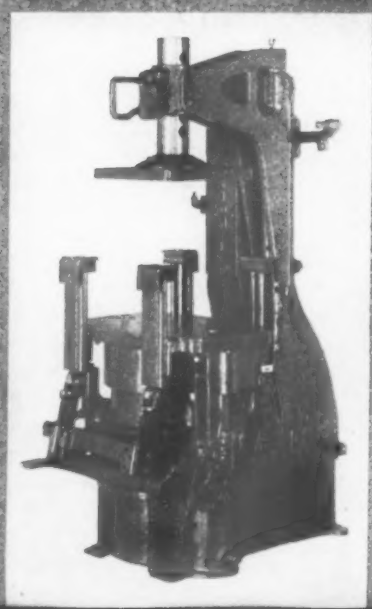

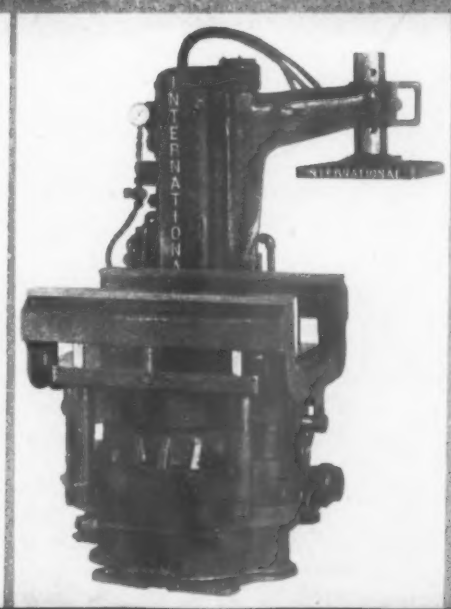

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(*Continued from page* 146)

Mr. Rodger Bronsen of Bronsen, Dennhy & Ulseth Inc., Chicago, who has spent the past ten years as an insurance man working for foundry safety.

Mr. Bronsen emphasized the fact that foundries having high safety standards usually have less labor troubles. The practice of placing too much credit on old-time or experienced molders as safe mechanics was another point brought out by Mr. Bronsen. Safety practices must be followed and enforced by top management to be a complete success, was the closing point of his talk.

Ralph Thompson, Electric Steel Castings Co., Indianapolis, served as technical chairman.

"Principles of Cupola Operation" will be presented at the next meeting by Ralph A. Clark, Electro Metallurgical Co. George Clark, Cummins Engine Works, Columbus, Ind., will serve as technical chairman.—*Jack W. Giddens.*

Northwestern Pa.

NORTHWESTERN Pennsylvania Chapter of AFA held its first technical session of the season at the Moose Club, Erie, Pa., Sept. 23. Speaker of the evening was C. E. Westover, Westover Engineers, Milwaukee, who talked on "Cost Control and Wage Incentives in the Foundry." In his talk Mr. Westover pointed out three steps in controlling labor and miscellaneous costs: Good organization—clear division of responsibility; careful analysis of work requirements in various jobs in a plant; and the translation of these findings into profits.

He also stated that one of the great problems in industry today is the fact that individual efficiency in industry has dropped 34 per cent since 1929 despite a 93 per cent increase in wage levels during the same period. Methods improvements and careful use of labor-saving machinery were pointed out as the only solution if industry is to survive under present selling ceilings.

Roger W. Griswold Jr., Griswold Mfg. Co., presented Albert Kuhn, Erie high school student, with a $25 cash award for his prize-winning essay on the subject "Why I Would Like to Work in a Foundry." Contest was held during the Erie Foundry Show held in the Erie YMCA last June.

A number of out-of-town guests were present for the meeting: Henry Trenkamp, chairman, and Gilbert Nock, secretary, Northeastern Ohio Chapter; Clyde Saunders, American Colloid Co.; Harry Reitinger, national AFA director and past chairman, Philadelphia Chapter; William Gude, THE FOUNDRY, and Thomas Eagan, chief metallurgist, Cooper-Bessemer Co., Grove City, Pa.—*John E. Gill, publicity chairman.*

Wisconsin

WISCONSIN Chapter of the AFA held its Oct. 11 meeting in the crystal ballroom of Hotel Schroeder, Milwaukee, where dinner was served to 254 foundry and supply men. Following the meal the guests and members adjourned to private meeting rooms where sectional meetings were held.

H. Swanson, Arrow Pattern & Foundry Co., Chicago, addressed the Pattern group, using as his subject, "Pressure Cast Aluminum Cope and Drag Patterns." H. Arneson, Spring City Pattern Works, Waukesha, Wis., was chairman, and R. J. Christenson, Wisconsin Pattern Works, Racine, co-chairman, of the group. The Malleable Iron division heard Walter Jaeschke, Whiting Corp., Harvey, Ill., who discussed, "Duplexing of Malleable Iron." Frank L. Harris, Belle City Malleable Iron Works, Racine, and J. B. Guterkunst, Milwaukee Malleable & Gray Iron Co., Milwaukee, acted as chairman and co-chairman, respectively. The Steel section was under the chairmanship of Harold A. Ziebell, Crucible Steel Casting Co., Milwaukee, with Michael Bock II, Unexcelled Chemical Corp., discussing "Exothermic Materials for Foundry Use."

C. O. Thieme, H. Kramer Co., Chicago, addressed the Nonferrous group, his subject being "Ingot Metal from Raw Material to Foundry." Arthur Higgins, Allis-Chalmers Mfg. Co., Milwaukee, acted as chairman. The Gray Iron division heard William McFerrin, Electro Metallurgical Co., discuss "Scrap Castings in the Foundry," under the chairmanship of J. V. Olle, Motor Casting Co., Milwaukee. George Antonic, Walter Gerlinger Inc., Milwaukee, addressed the Technical group, considering the "Origin of Sands and Interpretation of Sand Research." Walter Punko, Wehr Steel Co., West Allis, Wis., acted as chairman.

Among those present at the meeting were William A. Hambley, formerly metallurgist, Allis-Chalmers Mfg. Co., Milwaukee, and now general manager, Slinger Foundry Co., Slinger, Wis., accompanied by eight or more of his foundrymen and department heads, some of whom have joined the chapter recently.

Chairman Zuege announced that J. J. Ewens, Grede Foundries Inc., Milwaukee, recently elected a director of the organization, had found it necessary to resign and would be succeeded by Charles Fuerst, the Falk Corp., of that city.

Announcement of chairmen of committees to serve for the ensuing year includes the following: Program, A. C. Haack, Wisconsin Gray Iron Foundry Co., Milwaukee, chairman, assisted by M. A. Dantzler, Rundle Mfg. Co., C. M. Lewis, Badger Malleable & Mfg. Co., A. K. Higgins, Allis-Chalmers Mfg. Co., S. Mueller, the Falk Corp., and M. F. Frankard, Delta Mfg. Co., all of Milwaukee.

Other chapter chairmen include: Conference, R. J. Anderson, Belle City Malleable Iron Co., Racine; Apprentice, Max Snow, Wisconsin Vocational Schools; Arrangements, Leon Decker, Allis-Chalmers Mfg. Co.; Entertainment, E. N. Carpenter, Carpenter Bros., Inc.; Audit, George Tisdale, Zenith Foundry Co., all of Milwaukee; Educational, R. J. Anderson, Belle City Malleable Co., Racine; Golfing, E. C. Meagher, Chicago Retort & Firebrick Co.; Reception, M. A. Dantzler, Rundle Mfg. Co.; Membership, S. E. Shaver, Werner G. Smith Co.; Nominating, R. M. Jacobs, Standard Brass Works; Policy, John Bing, A. P. Green Fire Brick Co.; Student aid, W. Gerlinger, Walter Gerlinger Inc., all of Milwaukee; Old timers and apprentices, R. C. Woodward, Bucyrus-Erie Co., South Milwaukee; Historical, J. A. Leisk, Allis-Chalmers Mfg. Co.; Safety and hygiene, E. O. Jones, Belle City Malleable Co.; Official photographer, John Bing—*John E. Hubel.*

Northeastern Ohio

GOOD cupola operation is based on good supervision, it was pointed out by Tom E. Barlow, Battelle Memorial Institute, Columbus, O., in addressing the Oct. 11 meeting of the Northeastern Ohio Chapter of the AFA. The meeting, held at the Cleveland Club, was attended by approximately 200 members and guests, with Henry J. Trenkamp, chapter president, presiding. Prior to the technical session Pat Dwyer, THE FOUNDRY, gave a coffee talk in which he spoke entertainingly on a number of subjects without actually becoming involved in his proposed discussion of gates and risers.

Elaborating on the need for constant vigilance on the part of the cupola supervisor, Mr. Barlow discussed various factors which may prevent attaining consistently uniform conditions from day to day within the cupola. For instance, the bed should be measured not only by its height but also by the length of time it has burned; for correct comparison it should be measured each day at the same time after being lighted. Burned lining also will affect the bed height markedly and should be taken into consideration.

Since air is the principal material enter-

(*Concluded on page* 151)

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(*Concluded from page* 148)

ing the cupola Mr. Barlow recommended a check to determine if the proper amount is being introduced where it is required. The blower should be protected from dirt and dust if its efficiency is to be maintained; piping to the cupola should be installed correctly; and the windbox should be inspected to make certain that some tuyeres are not getting more than their share of the air at the expense of the others.

Subsequent discussion and questions from the floor covered a variety of subjects, including ways and means of overcoming difficulties resulting from the shortage of coke and scrap.

Patternmakers In Separate Session

Approximately 40 members of the Patternmaking Division of the Chapter held a separate technical meeting simultaneously with the cupola session. Speaker for the meeting was Arthur J. Tuscany, secretary, Foundry Equipment Manufacturers Association who talked on "What The Pattern Shop Means To Our National Economy."

In his talk he stated that the patternmakers' important place in the industry is not generally recognized. To illustrate, he pointed out that when the general public speaks of patterns it usually thinks of dress or suit patterns. Patternmakers should publicize themselves more, he said. To do this and to obtain other objectives they should form a national trade association. Such an organization would not only advertise the industry but, through co-operation of individual companies, would stimulate demand for its work, develop methods to increase profits, provide means for an interchange of ideas and permit analysis of the needs of the industry.

Mr. Tuscany went on to say that, to foster a spirit of co-operation, patternmakers should not look upon each other as competitors but as a group in competition with other industries which produce forgings, rolled steel, plastic and welded metal products. Because the pattern industry depends upon the success of the foundry industry, patternmakers should help foundries progress by furnishing them with high quality patterns from which good castings can be made.

There is a lack of cost accounting knowledge in the pattern industry, according to Mr. Tuscany. A trade association could offer suggestions for a cost system for individual firms in the industry. Pattern shops could also improve their equipment and better their housekeeping.

Ed Pierie, Motor Patterns Co., Cleveland, led the discussion period which followed the talk. Peter Rettig, Rettig Pattern Co., Cleveland, and group chairman, announced that the speaker for the next meeting would be Louis Schmidt, Aluminum Co. of America, who will discuss "Elements for Figuring Costs of Patterns".

Central Ohio

SECOND annual outing of the Central Ohio Chapter of the AFA, held Sept. 13, at the Brookside Country Club, was a repetition of last year's success. In spite of threatening weather, 200 serious-minded foundrymen turned out for the event. Their seriousness was not directed to foundry problems, however. The more ambitious members participated in golf, baseball, quoits and darts. Their arduous efforts were well rewarded by the splendid prizes supplied by the committee in charge of arrangements. Through the generosity of the suppliers of foundry products in the area, an imposing array of door prizes was distributed. An excellent dinner, followed by a floor show, concluded the party.

Nov. 25 meeting of the chapter, to be held at Hotel Chittenden, Columbus, O., will be a dinner meeting at 6:30 p.m. At the technical meeting at 8 p.m., R. E. Fisher, president, Bonney-Floyd Co., Columbus, will lead the steel section, and D. E. Krause, Battelle Memorial Institute, that city, will head the gray iron group, in round-table discussions of "Casting Defects."—*D. E. Krause, reporter.*

Metropolitan

WHILE predicting a critical shortage of scrap as long as present Office of Price Administration policy prevails, E. C. Barringer president and executive secretary, Institute of Scrap Iron and Steel, Washington, told members of the Metropolitan Chapter of the AFA in Newark, N. J., Oct. 7, that he "had a feeling" that OPA was going to be on its way out in January, because of likely Congressional changes at that time.

He believes that if price controls are lifted scrap quotation will probably shoot up and then level off, as supply and demand come into closer balance. Meanwhile, with dealers unable to make a profit on scrap, Mr. Barringer looks for no improvement in supply. He has little faith in the effectiveness of "drives" such as now proposed, and he anticipates no early important benefits from the ship breaking program.

Further, he expressed little hope of obtaining any substantial amounts of overseas battle scrap. Much more of this scrap is in the Pacific than in Europe, and the cost of moving scrap from the Far East is almost prohibitive; and as for European scrap, he further explained, little or nothing is coming in with the outlook not promising.

Mr. Barringer was the featured speaker at a meeting—the first of the new season—devoted entirely to the subject of scrap and secondary metals. On the conclusion of his address roundtable sessions on steel, cast iron and nonferrous metals were held, with A. B. Morrison, Atlas Foundry Co., Irvington, N. J.; R. A. Flinn, American Brake Shoe Co., Mahwah, N. J.; and Dr. N. E. Woldman, Woldman Engineering Laboratories, Newark, respectively, serving as discussion leaders.

Harold L. Ullrich, works manager, Sacks-Barlow Foundries Inc., Newark, and newly elected chairman of the chapter, announced that the chapter's annual Christmas party will be held Friday evening. Dec. 13.—*Ben K. Price.*

Seattle Foundrymen Form AFA Chapter

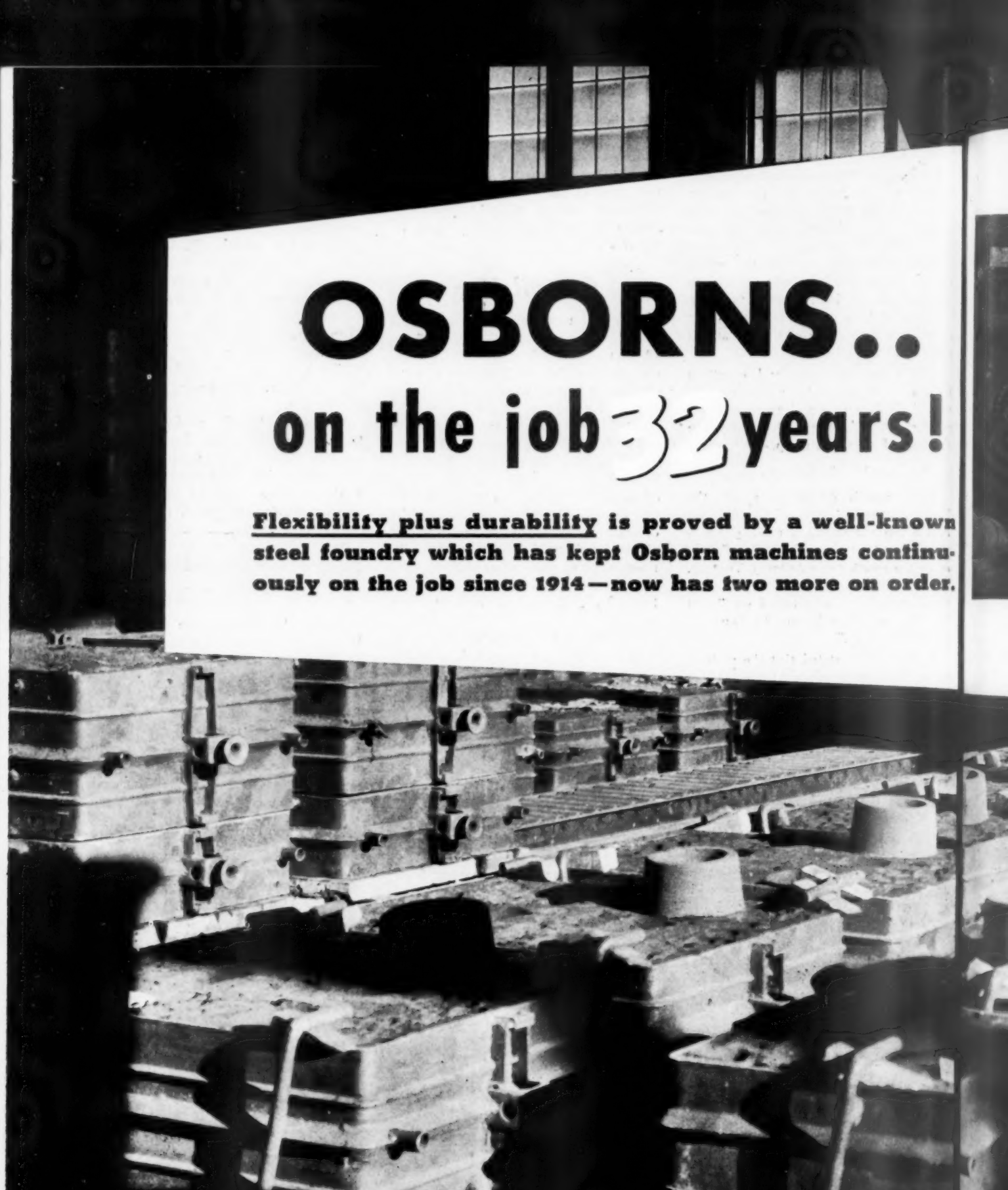
Seattle foundrymen are forming a local chapter of the American Foundrymen's Association following conferences in Seattle with Sheldon V. Wood, Minneapolis, national president and W. W. Maloney, Chicago, secretary. The Seattle group was represented by C. M. Anderson, Eagle Brass Foundry Co., chairman; George E. Rauen, Olympic Foundry Co., vice chairman; A. D. Cummings, Western Foundry Sand Co., secretary-treasurer.

Directors include: J. D. Tracy, Salmon Bay Foundry Co.; F. C. Rogers, Olympic Steel Works; C. W. Summerville, Seattle Brass Co.; E. D. Boyle, Puget Sound Naval Shipyard, Bremerton; Gilbert S. Schaller, professor of mechanical engineering, University of Washington and V. C. Creten, Atlas Foundry & Machine Co., Tacoma, Wash.

Societies Sponsor Foundry Course

An educational course, "Fundamentals of Foundry Practice," was presented at Bradley Polytechnical Insitute, Peoria, Ill., during October by the Central Illinois Chapter of the American Foundrymen's Association and the American Society for Metals. The subject was selected by popular demand.

Speakers for the class were Prof. H. L. Walker, head of mining and metallurgical engineering, University of Illinois; Alex Barczack, vice president, Bardes Forge & Foundry Co.; J. E. Kolb, superintendent, pattern shop, U. S. Sullivan, general foreman of foundry inspection, and S. Garry, former general foreman of the coreroom, Caterpillar Tractor Co.



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MAGNESIUM ASSOCIATION

Sees Steady Growth in Demand

By BEN K. PRICE
New York Editor, THE FOUNDRY

EXPERIENCING rapid peacetime growth, magnesium production this year is scheduled to run well over ten times prewar volume, Dr. J. D. Hanawalt, general manager, Magnesium Division, Dow Chemical Co., Midland, Mich., declared at the third annual convention of the Magnesium Association, held at the Waldorf-Astoria, New York, Oct 3-4. He anticipated still further expansion, as "the magnesium industry can expect to enjoy relatively decreasing costs and increasing popularity." T. W. Atkins, executive secretary, estimated consumption will be at the rate of 100,000 tons annually by the end of 1947.

The convention also marked the first International Magnesium Congress, with leading foreign authorities on the program. Concurrently, an attractive exhibition was held, displaying the latest in magnesium products, together with samples of castings, forgings, extrusions, sheet, rod and bar.

In addition to problems relating directly to the industry, certain of the broader economic aspects affecting the country as a whole came in for discussion, with C. Donald Dallas, president, Revere Copper & Brass Inc., New York, taking a lead and highlighting disconcerting trends, which, he said, it is the duty of industrial leadership to combat. He pointed out that enterprise in this country, far from being free, "is rapidly being brought to a standstill" by governmental restrictions and dislocations of one description or another.

Asserting that the natural supply of magnesium is inexhaustible, Edward S. Christiansen, Magnesium Co. of America, Chicago, and retiring president of the association, pointed out that 58 companies, 95 per cent of whom entered the magnesium field for the first time during the war, have converted to civilian production. These with others new in the industry are "forming the backbone of a permanent and extensive magnesium industry in this country."

Anthony Cristello, Eclipse-Pioneer Division, Bendix Aviation Corp., Teterboro, N. J., chairman, Technical Committee, said that the association membership will be canvassed shortly by the use of a questionnaire incorporating pertinent questions regarding individual problems and applications of magnesium alloys. In order to properly cover all phases the responsibility for the development of the survey will be delegated to individuals most familiar with the following: Sand casting and permanent mold casting, die casting, sheet and extrusions, smelting and refining, forgings, and fabricating operations such as machining welding, etc. Once all data have been collected, the committee will embark on a definite program of co-operative research and experimentation.

A. W. Winston, the Dow Chemical Co., Midland, Mich, chairman of the Standards Committee, asserted that the committee hoped to have prepared within the next few weeks a rough draft of a booklet, subject later to the approval of the casting division, setting forth the essential information which should be noted on part drawings or orders. Such a booklet, it is believed, will do much to eliminate the quality and inspection questions which arise too frequently after an order is partially completed.

Mr. Winston said the committee is studying the matter of uniform designations for various chemical treatments, and also stated that the National Aircraft Standards Committee has recommended that the Magnesium Association give consideration to publication of a booklet in which would be listed all of the standard and certain special magnesium structural shapes to aid designers in specifying magnesium shapes available from at least one of the association member plants.

Expects Increased Demand

Maj. C. J. P. Ball, chairman, Magnesium Elektron Ltd., London, said that combined Anglo-American magnesium capacity was raised from 16,000,000 lb to 672,000,000 lb during the war. The day is not distant, he added, when the requirements for peace will call for even this tremendous output created by war.

Dr. Hanawalt said that present magnesium costs are not due to fundamental characteristics of the metal, but are the result in many cases of lower production volume and less production experience as compared with longer established metals.

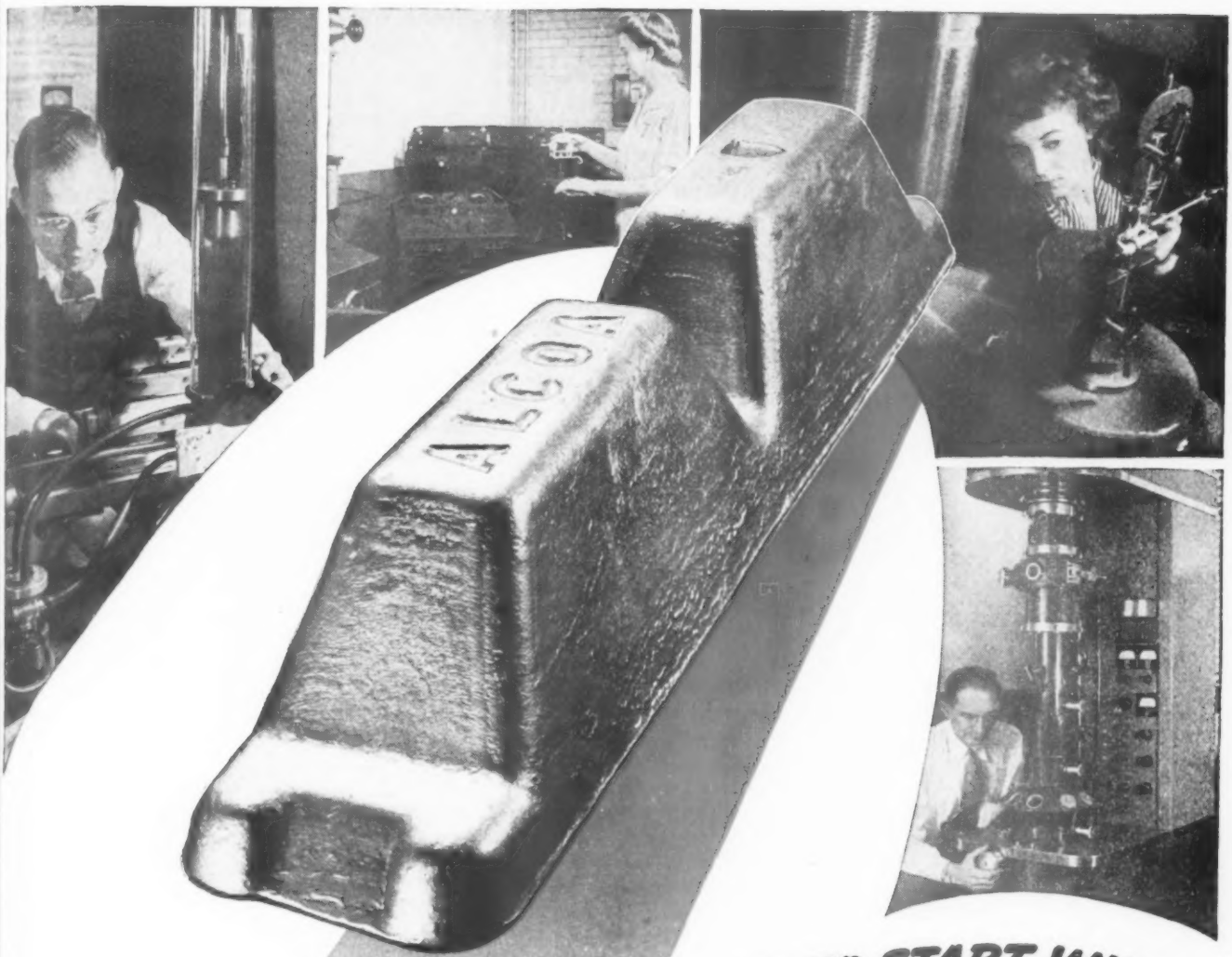
Fully enclosed and automatic handling of molten magnesium in continuous casting and in continuous strip rolling for making sheets are the two fields in which most progress is being made in cost reduction of processing, he pointed out. However, he added, progress also is reported in both alloy castings and forging as well as in experiments in increasing the fatigue strength of the metal.

He listed several promising developments including enclosed and automatic handling of molten magnesium in the casting field, recent progress in electroplating magnesium, cladding of steel with a more anodic magnesium alloy and recent work in brazing magnesium.

Ralph Heintz, vice president, Jack &

(*Concluded on page* 156)

Among those present at the Magnesium Association convention were, left to right: R. J. Cross, managing director, Essex Aero Ltd., London, England; Howard Perkins, president, Brooks & Perkins, Detroit; Edmund Lewis, works manager, Essex Aero Ltd.; Major C. J. P. Ball, chairman of the board, Magnesium Elektron Ltd., London; Irving T. Bennett, vice president, Revere Copper & Brass Inc., Baltimore; R. D. Taylor, assistant manager, Eastern Operations, Federated Metals Division, American Smelting & Refining Corp., New York, and newly elected president of the Magnesium Association



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(*Concluded from page* 154)

Heintz Precision Industries Inc., Cleveland, in describing large scale practical opportunity for uses of the metal, said that buses, trucks and finally automobiles in that order will be using more magnesium structural parts as time goes on. He is planning to build a high performance engine entirely made of magnesium and alloys.

G. W. Motherwell, works manager, Wyman-Gordon Co., Worcester, Mass., discussed various outstanding qualities of magnesium, such as lightness, stiffness, machinability, and asserted that, in his opinion the matter of corrosion will represent no problem. He also discussed high strength alloys, offering favorable comparisons with high strength aluminum and mild steel.

British technical experts were inclined to discount the cost importance of a widely publicized new American process of smelting magnesium directly from magnesium silicate ores.

Elect New Officers

Newly elected officers of the Magnesium Association are: President, R. D. Taylor, assistant manager, eastern operations, Federated Metals Division, American Smelting & Refining Co., New York; vice president, J. D. Barrington, vice president and general manager, Dominion Magnesium Ltd., Toronto, Canada; treasurer, Irving T. Bennett, vice president, Revere Copper & Brass Inc., Baltimore.

Directors are J. D. Barrington; Irving T. Bennett; Arthur Bidwell, president, Superior Bearing Bronze Co., Inc., Brooklyn; Wiser Brown, vice president, American Magnesium Corp., Cleveland; Edw. S. Christiansen, president, Magnesium Co. of America, Chicago; Anthony Cristello, manager, foundries, Eclipse Pioneer Division, Bendix Aviation Corp., Teterboro, N. J.; Leo B. Grant, sales manager, Magnesium Division, Dow Chemical Co., Midland, Mich.

Also, Fred Hengsch, president, Castalloy Co., Cambridge, Mass.; Clayton E. Larson, general manager, White Metal Rolling & Stamping Corp., Brooklyn; D. W. Moll, vice president and treasurer, Hills-McCanna Co., Chicago; G. W. Motherwell, works manager, Wyman-Gordon Co., Worcester, Mass.; W. H. Osborne, secretary, Acme Aluminum Foundry Co., Chicago; E. H. Perkins, president, Brooks & Perkins Co., Detroit; D. A. Rhoades, vice president, Permanente Metals Corp., Oakland, Calif.; V. D. Sweeney, general sales manager, National Smelting Co., Cleveland and R. D. Taylor.

T. W. Atkins remains as executive vice president and secretary of the association.

MECHANIZE BATHTUB FOUNDRY

(*Concluded from page* 72)

unite with the iron is one of the difficult features in the sequence of operation. If the furnace is too hot it will burn off the slush and the enamel will not adhere to the iron. After the slush coat has been air dried, the tubs are wheeled in on trucks and placed near the heating furnace. Ten gas-fired furnaces are in operation. Since the equipment and method of operation is the same in all cases, the present description will be confined to one casting and one furnace.

A long fork made from a 20-ft length of 3-in. steel pipe provided with a T-handle at one end and a fork at the opposite end is employed for lifting the tub into and out of the furnace and also for lifting it into and out of the frame where it is manipulated while the finish coat of enamel is being applied. The pipe is suspended from a swinging jib crane at a point near the fork end. With the leverage obtained by this arrangement one man readily can handle tubs varying in weight from 275 to 355 lb. The casting must be handled rapidly and accurately after it has been heated. This would be impossible if the operator was burdened with any appreciable weight.

The tub is supported in the furnace on two rails which help it to retain its shape even when raised to a high heat each time the slush or enameled coat is melted down. Special devices are employed in other furnaces where smaller castings are heated preparatory to enameling.

Tub May be Tilted

After the slush coat has melted the tub is taken out of the furnace and placed in a special device where, by a ball joint and suitable gearing controlled by the hand wheels, the tub may be tilted to any position. The tub is attached to the table and held there by its own weight. Two men apply the enamel powder, one man standing on each side of the table. The tub is tilted to many positions to enable the men to apply the enamel evenly over all the surface. When the casting is entirely covered, the table is returned to a horizontal position and the tub is lifted out of the frame and placed back in the furnace. Usually two or three coats of enameling powder are applied, with the tub reheated after each application. When finally the tub is removed from the furnace it is inspected, and if it is satisfactory it is conveyed to a room where it is allowed to cool slowly.

Enamel for the finish coat is applied in the form of a fine white powder sifted through a 40 to 60 mesh screen mounted on the end of a long handle and actuated by a vibrator. The long handle enables the operator to stand back a comfortable distance from the red hot casting where he is in a favorable position to guide the sifter over the surface of the casting while the vibrator shakes down the powder. The casting is heated to 1600 F to melt down the ground coat. A temperature of about 1100 F is required to settle the finish coat. Time required to heat the casting depends on the shape and size and varies from 2 or 3 to 15 or 20 minutes.

National Founders To Meet Nov. 7-8

National Founders Association will hold its 49th annual meeting at the Waldorf-Astoria Hotel, New York, Thursday and Friday, Nov, 7-8. Among the men who will address the meeting are: Stuart S. Ball, counsel, Montgomery Ward & Co.; Gerard D. Reilly, recently with the National Labor Relations Board; Martin Dies, of the recent well-known Dies Committee; R. G. LeTourneau, president, R. G. LeTourneau Inc., Peoria, Ill.; Cecil B. Dickson, executive editor, Gannett News Service, Washington, who will analyze the newly elected Congress, and Harold A. Vonachen, M. D., Caterpillar Tractor Co., Peoria, holder of the Knudsen Award for his work in industrial hygiene and medicine.

Other speakers will discuss industrial relations and equally important subjects. The program is as follows:

Thursday morning, 9:30:
Invocation—Rev. Roscoe T. Foust, rector, Church of the Ascention, New York.
President's report—Herman Menck, Harnischfeger Corp., Milwaukee.
"An Analysis of Election Returns"—Cecil B. Dickson.
"Re-creating Through Recreation"—C. E. Brewer, National Recreation Association Inc., New York.

Thursday afternoon:
"The Wagner Act—Repeal or Amend"—Gerard D. Reilly, retiring member, National Labor Relations Board, Washington.
"The Balance of Power"—Stuart S. Ball.
"Trends in Collective Bargaining"—O. C. Cool, director, Labor Relations Institute, New York.
"Business—Not as Usual"—R. G. LeTourneau.
Election of officers—W. W. C. Ball, chairman, nominations committee.
Reception—Open House, Astor gallery.

Friday morning, 9:30:
"The Who and How of Foremanship"—DeLoss Walker, Chicago.
"Health and Safety Program to Promote Our Industry"—H. A. Vonachen, M.D.
"The Growing Threat of Fellow Travelers"—Martin Dies.

Pioneer Foundry & Mfg. Co., Gilbertville, Mass., recently has been formed for the production of small and medium size gray iron castings. Organizers are Louis J. Iadarola and N. P. Benson.

VOLCLAY BENTONITE

NEWS LETTER No. 15

REPORTING NEWS AND DEVELOPMENTS IN THE FOUNDRY USE OF BENTONITE

YOU MAY BE SURPRISED AT THIS!

Natural Molding Sands and the Best Fireclay Bonds when heated to 900° F. for a short time and then retempered

SHOW A LOSS OF 20% TO 60%

of their original green bonding strength.

Volclay Bentonite heated the same way and retempered

LOSES NONE OF ITS ORIGINAL GREEN STRENGTH!

Let your laboratory check this statement.

All natural clays, fireclays, and bentonites, lose most of their bond PERMANENTLY when heated to above 1400° F. Fortunately, only a thin skin of mold (except on larger castings) reaches those completely dehydrating temperatures. BUT, in that area of sand which is heated from 450° F.-900° F., natural sands and fireclays are partially deteriorated, WHILE VOLCLAY COMES BACK WITH 100% OF ITS GREEN STRENGTH!

Burned clay of any kind is detrimental to molding sand. Heap sands renewed with VOLCLAY accumulate LESS BURNED clay and furnishes MORE LIVE clay.

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Producers of Volclay and Panther Creek Bentonite

THE SIDE-BLOW CONVERTER IN POSTWAR PERIOD

(*Continued from page* 76)

superior type of cast iron.

Our resources of low phosphorus iron ore are being rapidly depleted and, more and more, the steel foundries using an acid process are worrying about phosphorus. Several electric steel foundries which previously operated with acid furnaces found it necessary to change to basic operation during the late war. The acid open-hearth operators are finding it increasingly difficult to hold phosphorus content within specification limits.

There are no basic lined converters in America either in the foundries or in the mills. The method of dephosphorizing acid bessemer steel in the ladle, developed by Gordon Yocom at the Wheeling Steel Corp., is, of course, well known and eminently successful. The phosphorus content of our ores, even those in the southern states, is not high enough for the Thomas-Gilchrist basic process so widely used in Europe. Some recent experimental work, the results of which are not yet available for publication, indicates the possibility of a modified basic operation for converters whereby most of the phosphorus and some sulphur is removed without an after blow, the necessary heat units being provided principally by silicon and carbon. This process will require thorough investigation before any information is ready for publication. It is mentioned here only as a possible future development for converter operation.

Use Low Pressure Air

The orthodox bessemer converter used in the steel mills has bottom tuyeres and operates with air at 20 to 25 lb pressure. About 150 hp is required for the blowing engine motor per ton of metal in the vessel; consequently, the blower is a very expensive piece of equipment. The sideblow converter operates with air at 3 to 5 lb pressure, and the blower requires about 40 hp per ton of metal in the vessel.

Nitrogen pick-up in the side-blow operation is practically nil whereas in the standard bessemer operation the metal picks up nitrogen directly in proportion to the depth of the bath. The nitrogen content of side-blow metal is about one-fourth that of ordinary bessemer steel and is comparable to that for good open-hearth or electric steel.

The side-blow converter makes hotter steel than the standard bessemer vessel for a given composition of the charge, probably because carbon burns to CO_2 inside the vessel, whereas in standard bessemer operation carbon monoxide is formed first which burns to CO_2 outside the vessel. As evidence of the hotter metal produced by side-blow operation, the big bottom-blow bessemer vessels are often turned down for side blowing when the heat appears to be cold.

There is far less danger of over-blowing and consequent over-oxidation with side-blow operation, because the reactions are slower, and because the blast can be turned off immediately at the drop of the flame, without waiting to turn down the vessel to a horizontal position. One prominent steel manufacturer who has done a great deal of experimental work with side-blow operation, is convinced that side-blow metal is definitely superior to that from the standard bessemer unit.

Blowing Loss Comparison—The claim is often made that blowing loss is higher with the side-blow vessel, which may be due to the size of the vessels being compared. Capacity of the usual side-blow converter is 2 or 3 tons, whereas the usual standard bessemer converter is of 20 to 25 tons capacity. The 6-ton side-blow converter operates with a lower blowing loss than the usual 2 to 3-ton vessel. If side-blow converters of 15 to 25-ton capacity are built, there is good reason to believe that the blowing loss would be comparable to that for the large bottom-blow vessels.

The converter process has never had the benefit of the intensive research investigations which have been applied to the open-hearth and electric furnace processes. Recently, considerable study by an important steel manufacturer has suggested a greatly improved design for the side-blow vessel, and claims are made for improved lining life, lower blowing loss and greater flexibility in capacity.

With all the advantages of the side-blow converter it would seem logical for the big mill operators to investigate the possibilities of side-blow operation. As indicated previously, these advantages may be listed as follows: 1. Lower nitrogen content of the steel. 2. Hotter steel for the same composition of charge. 3. Less danger of over-blown metal. 4. Lower power requirements. 5. Closer control of the composition of the finished steel. 6. Much smaller initial investment.

An interesting application of the side-blow converter developed during the last few years is in connection with the process known as triplexing. This is a method for the continuous production of steel using the cupola, converter and electric furnace. Steel can be supplied continuously in large quantities to pour molds made on a production basis, and poured on a moving mold conveyor. One foundry has produced steel in this way at a rate of 21 tons per hour, to supply metal for a moving conveyor where molds were being poured at a rate of five to six per minute.

J. Bukowski and C. J. Laws report in the May, 1946, issue of *Steel Foundry Facts* on an interesting duplexing process, employing a converter and high frequency electric furnace for the manufacture of a stainless steel containing 25 per cent nickel and 20 per cent chromium. A concentrated alloy of nickel and chromium was melted in the induction furnace, and this alloy was mixed with blown metal. Production of stainless steel was thereby greatly increased. The article states as follows: "The steel pours satisfactorily and no trouble was encountered either through metal faults or inadequate physical properties."

An interesting article in *Metallurgia* in September, 1944, by P. C. Fassotte, describes a novel triplexing process developed in England during the war, involving cupola, rotary coal-fired furnace and side-blow converter. Cupola metal was superheated in the rotary furnace and charges with 0.2 per cent silicon and less were blown with an increment in temperature of 350 and more. Heat units were supplied principally by oxidation of carbon. Gas analyses are reported showing practically no carbon monoxide escaping from the vessel.

Presents Many Advantages

The advantages claimed for the process are: 1. Elimination of pig iron and ferrosilicon from the cupola charge. 2. Reduced consumption of ferrosilicon in the converter. 3. Reduced blowing loss. 4. Increased flexibility and production. 5. Longer lining life. 6. Less variation in phosphorus content (due to rotary furnace acting as a mixer). 7. More continuous cupola operation. 8. Reduced quantity of converter slag.

The principal disadvantage noted is a considerably increased capital expenditure.

Summary—To summarize, it would seem that the possibilities for the application of the side-blow converter in the postwar period lie in the following fields:

1. In the iron foundries for the production of high strength iron by blending cupola metal and blown metal.

2. In the steel mills where it should prove to be a possible competitor for the orthodox bottom-blow bessemer.

3. The possibility for basic operation should be investigated as this would make available a supply of raw material now unusable for converter operation because of its high phosphorus content.

4. For application in large production steel foundries in connection with a cupola and electric furnace for the so-called triplexing operation. This is the

(*Concluded on page* 161)

THE IMPROVED Redford CORE BLOWER

CARTRIDGE BENCH TYPE

Users report remarkable increases in quality and quantity of production.

Produces variety of intricate cores with unusual speed and simplicity.

Comes ready to use—virtually no installation cost.

Can be operated with unskilled labor—extremely easy to use.

If you make cores 2 lbs. or under—this unit ideally suited to your use.

Designed by practical foundrymen.

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complete details and new booklet.

When making cores from horizontally split boxes, the work of placing driers and drawing the box is done on the base of the machine

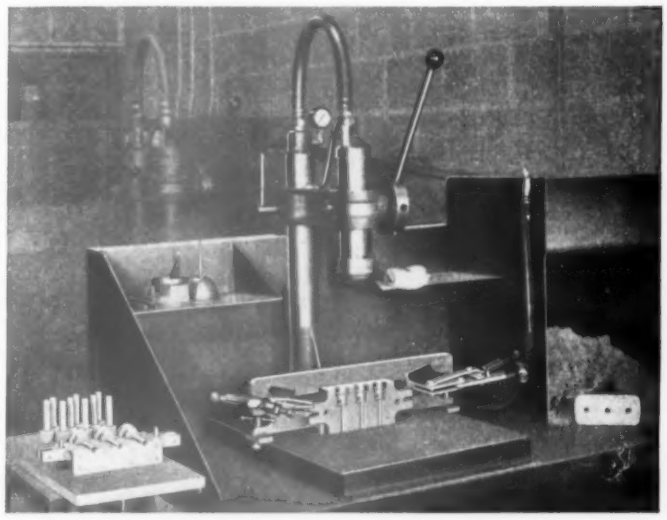
FILLS NEED FOR SIMPLE, FLEXIBLE CORE BLOWER

The New *Redford Bench Core Blower* has met with enthusiastic acceptance by foundrymen because it supplies an important need in the foundry for an efficient, low-cost method of blowing small, intricate cores. It requires no large volume of air and readily lends itself to handling a variety of core boxes. In fact, they tell us that it is the ideal method of making cores in single or gang boxes requiring a maximum of 2 lbs. of sand.

SAND CARTRIDGES AVAILABLE IN 9 STANDARD SIZES

Blower comes complete, ready to use. Each blower provided with one Size "C" sand cartridge which is adaptable to a large range of core boxes. Cartridges are available in eight additional standard sizes and special sizes furnished where needed.

If you have any Core Blowing Problems write or call our Engineering Department. We will change your present equipment for blowing or assist you in designing proper equipment.



The Core Box Clamping Attachment is used when blowing split core boxes vertically (on end). It is quickly adjustable to permit use of different size core boxes. Changeover requires only a few minutes

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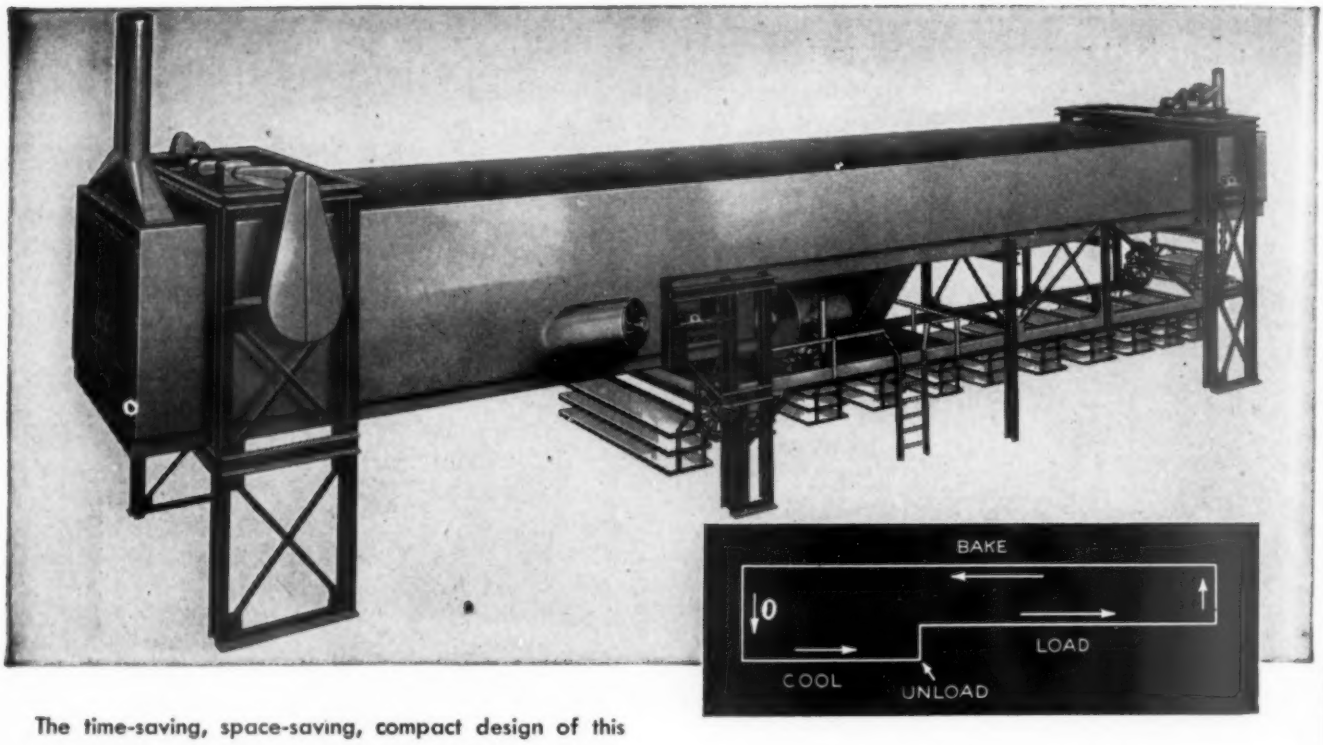

New HORIZONTAL CORE OVEN . . . . . offers many cost saving advantages!

The time-saving, space-saving, compact design of this new Horizontal Core Oven is characteristic of Young Brothers' Engineering. Into it went the skill and confidence of many years of experience . . . also a thorough knowledge of the job to be done and the production problems involved.

This new core oven can be installed in practically any building without making any major structural changes.

The coremakers are located right next to the oven so that they can load the cores directly on the moving racks thus eliminating the necessity of transporting them on hand trucks or a conveyor from the core room. The location of the coremakers, at the oven, also saves core room space.

The size of the loading racks can be varied and the shelves can be adjusted to accommodate cores of many sizes and shapes.

Besides allowing for the removal of exhaust gases at the point of greatest concentration, the new oven design provides an effective cooling zone for the cores and assures comfortable working conditions for the coremakers.

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(*Concluded from page* 158)

most logical method for producing steel continuously to supply steel for molds made on a production basis and poured on a moving mold conveyor.

5. Duplexing with converter and high frequency electric furnace to increase output.

6. Possibility for greatly improved design of the side-blow vessel which would improve its efficiency in all applications.

The writer has often been accused of a bias in favor of converter operation—which is absolutely not the case. As a matter of fact, he has made perhaps ten times as much steel with open-hearth and electric furnaces as with converters. All of the recognized processes will make good steel with proper operation, and will also make very inferior steel with improper operation. All processes have an application where they best fit, and it is important before deciding upon the melting process to be employed to take into account all economic and metallurgical factors.

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7. "Comparative Quality of Converter Cast Steel," by Sims and Dahle, *Proceedings*, ASTM, vol. 42, 1942.
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British Institute Discusses Metals

Autumn meeting of the Institute of Metals (Great Britain) was held in London, Sept. 10-11, with Col. P. G. J. Gueterbock, president, presiding. Papers presented and discussed included:

"Antimonial 70:30 Brass" by D. McLean and L. Northcott, Armament Research Department; "Hot-tearing Tendencies of Aluminum Casting Alloys" by D. G. G. Lees, British Nonferrous Metals Research Association; "Application of Some Thermodynamical Principles to the Liquidus Surface of Alloys of Aluminum with Magnesium, Silicon and Iron" by H. W. L. Phillips, British Aluminum Co. Ltd.; "Ageing of a High-purity Aluminum Alloy Containing 4 Per Cent Copper" by Marie L. Gayler, National Physical Laboratory; "Cold-working of a High-purity Aluminum Alloy Containing 4 Per Cent Copper and Its Relation to Age Hardening" by Marie L. Gayler.

"Control of Internal Stresses in Heat-treated Aluminum Alloy Parts" by L. E. Benson, Metropolitan-Vickers Electrical Co. Ltd.; "Inverse Segregation in Cast Magnesium Alloys" by R. J. M. Payne, J. Stone & Co. Ltd.; "Intercrystalline Corrosion of Aluminum-magnesium Alloy Rivets" by G. J. Metcalfe, Royal Aircraft Establishment; "Resistance to Corrosion by Sea Water of Some Alpha-Tin and Alpha Tin-aluminum Bronzes" by J. W. Cuthbertson, Tin Research Institute; "Capillary Flow in the Soldering Process and Some Measurements of the Penetration Coefficients of Soft Solders" by A. Latin, British Insulated Callender's Cables Ltd.; "Physical Properties and Temper-hardening Characteristics of Copper-nickel-manganese Alloys" by M. Cook and W. O. Alexander, Imperial Chemical Industries Ltd.; and "Inert Atmospheres as Fatigue Environments" by H. J. Gough and D. G. Sopeith, National Physical Laboratory.

BEATING THE COKE SHORTAGE

(*Continued from page* 77)

advantageous schedule has been found, it should be followed thereafter. The cupola is charged to the door sill and the blast turned on, leaving the taphole open. In 8 to 10 minutes a steady, continuous stream of metal should flow through the taphole. If the bed is too high a longer time will be required usually accompanied by a dribbling stream of cold iron. With too low a bed the time is less than 8 to 10 minutes and a fair sized stream of cold iron appears. Hence, in accordance with the observations, an adjustment is made in the bed height for the next day's heat, increasing or decreasing the coke by a definite volume—say 3-in. steps for cupolas up to 48 in.; 4-in. steps up to 66 in., and 6-in. steps for those over that size.

Proper coke split to be placed between iron charges will vary according to type of material used in the iron charge, desired composition of the resulting iron, tapping temperature required, etc. Hence, coke-to-iron ratios may vary from 1 to 5 or 5½ up to 1 to 12 or 14. Where light-section scrap is used less coke may be used to melt and obtain a given superheat than in the case where the scrap is heavy, due, as Tom Barlow points out, to the rate of heat transfer from burning coke to the metal; and light material becomes heated through more rapidly.

While the general prevailing practice is to select a given weight for the iron charge and then adjust the coke ratio to that, modern thinking indicates that it should be the other way round. Both Don Reese and A. J. Edgar recommend that 7.5 lb coke per sq ft of cupola area at the tuyeres be used and the iron charge be 8 to 12 times that figure, depending upon the amount of steel scrap in the charge. Steel scrap is low in carbon and during the melting process absorbs a certain amount of carbon from the hot coke. That carbon is lost as far as heating value is concerned. Hence, more coke is required when steel scrap replaces cast iron scrap in the charge. Therefore, the carbon content in the iron charge should be calculated so that the actual amount of carbon available in the coke for combustion may be ascertained, and the proper ratio between coke and iron established.

If the coke splits are too large it will show in a drop in metal temperature as well as a decrease in melting rate. Too small coke splits are indicated by a decrease in metal temperature without much change, if any, in melting rate, and an increase in the depth of chill of a chill-cast specimen of the iron. From these observations the coke splits may be increased or decreased as the case requires. As A. J. Edgar states, only 140 lb of coke are required to melt and raise the temperature of a ton of iron to 2850 F, based on the amount of coke reacting thermally using 65 per cent of theoretical heat value. This does include the coke used in carburizing the iron. Consequently, there appears to be a good field to save coke by careful check of the amount used in the splits.

Stack Height Important

Height of the charging door sill above the tuyeres has an important bearing on the amount of coke required in the splits between the iron charges. Tom Barlow has stated that with a height of 11 ft, it is estimated that 25 lb additional coke will be necessary in the splits to obtain the desired metal temperature. This is because with a low stack height the descending charges do not have the opportunity to absorb sufficient heat from the ascending, outgoing gases of combustion. On that point the *Handbook of Cupola Operation* states: "Authorities offer various formulas for determining the correct effective height of the cupola in relation to the diameter inside the lining. For a cupola with 40 to 60 in. inside diameter, it is stated that for most economical operation the effective height should be 18 ft. For a 72-in. inside diameter, an effective height of 20 ft is recommended. Another operator recommends that the effective height should be 4 to 5 times the inside diameter of the cupola. The height of a cupola, at even the largest diameter, is seldom more than 22 ft."

One experienced and successful cupola operator states he has effected substantial coke savings by being careful to position the coke at the center of the cupola, with pig iron and scrap adjacent to the

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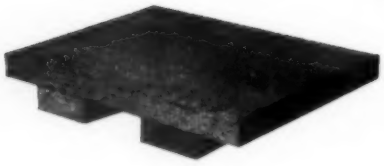
Everything you ne f

PEAK PROD T



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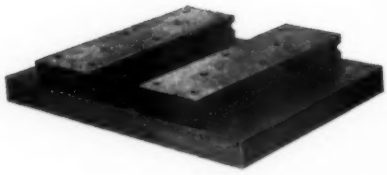

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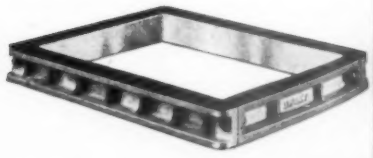

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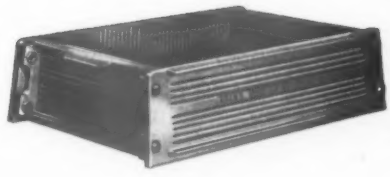

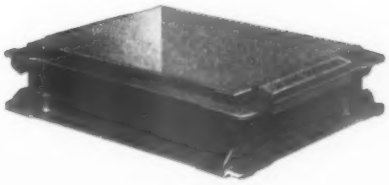

Descriptive literature on any of these items gladly furnished!

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(*Concluded from page* 161)

lining. However, this is contrary to practice of other operators who prefer to level off alternate layers of coke and metal charges.

According to B. P. Mulcahy in "Coke Properties and Cupola Melting" in the November, 1944, issue of THE FOUNDRY, coke size and chemical composition are important consideration in cupola operation. He states that other conditions remaining the same, the rate of combustion of any coke is a function of the type of carbon present and the particle size. In other words, a coke of 2-in. average size with a residual volatile matter of 2.0 per cent will burn faster than a 2-in. coke with only 1.0 per cent volatile matter content. This is true because the influence of the additional 1.0 per cent volatile matter lowers the ignition point of the coke appreciably, and the oxygen surrounding the coke particle is consumed more rapidly in the reaction with the carbon. With this same coke on the rate of decomposition of the CO_2 is faster, which means that after the O_2 is consumed or depleted the CO_2 decomposition can proceed at a faster rate, temperatures of course, permitting. Effect of coke of this nature is to narrow the zone of maximum temperature in the bed where O_2 exists, and the secondary reaction of CO_2 decomposition tends to produce lower temperatures over a broader zone above the combustion area.

Favors Uniform Size Coke

Mr. Mulcahy says further: "This same effect of change of rate or reaction is also a function of coke size because of the differences in exposed coke area. The writer firmly believes that this effect of size is more important than the change in character of carbon (encountered in normal carbonizing practice) in influence on overall temperatures and reaction rates in combustion of coke, and further that a coke with a wide range of sizes cannot be controlled in its combustion rate nor give the same thermal efficiency as a similar coke uniformly sized.

"In the selection of a coke size for an individual operation, the diameter of the cupola should not be the only determining factor. There is a general relationship, it is true, but normally this applies only in the range of average gray iron composition. . . . Larger coke (plus 4 in. or plus 5 in.) is conducive generally to the fastest melting rates and greater ease in obtaining maximum temperatures. This is due to its greater permeability permitting air and gases to penetrate the bed to a greater distance. This in turn causes melting to occur over a larger area of the bed. In certain instances, however, when sufficient penetration of the bed is not effected, large coke can cause excessive oxidation because of the narrow path of travel of gases over a limited carbon surface. Effect of less carbon surface exposure is reflected further in the necessity for deeper initial and operating beds. Oxygen in the air travels higher above the tuyeres before it is consumed which results in a broad, deep zone of maximum temperature.

"The smaller coke (3 x 4 in.) offers some interesting contrasts to that reported for the larger coke. Maximum temperatures (2850 F plus) are more difficult to attain as also are maximum melting rates, particularly in the larger cupolas. Lower carbons invariably result, lower operating beds are required and appreciable reductions in silicon and manganese losses occur. Higher windbox pressures generally obtain, but the greater carbon surface exposure counteracts this influence on oxidation as the lower silicon and manganese losses indicate. The melting zone as reflected by the lining burn-out is much narrower and closer to the tuyeres. The 3 x 4-in. coke at the present time is performing very satisfactorily on cupolas ranging from 32 to 72 in. in diameter.

Make Changes Gradually

"The intermediate size of coke (3 x 5½ in.) gives, as is to be expected, intermediate results and operates very favorably with medium sized cupolas. Where lower carbons are desired in the medium range, this size accomplishes that purpose. It should not be thought, however, that a change in coke size can be made without having to make some adjustments to operating procedure, for it is seldom that conditions are so balanced to permit the substitution with no change. The smaller coke requires much more careful balancing of conditions than does the larger coke, particularly to obtain desired melting rates and temperatures, and this is especially true with respect to coke quantities and air rates. Generally the changes are made gradually to observe the trend of performance on the particular installation."

During the war the coal and coke shortage became extremely acute in Great Britain and the Technical Committee of the Institute of British Foundrymen cooperated with the Ministry of Fuel and Power recommending practices to hold consumption of coke to the minimum. It suggested that the double row of tuyeres be reduced to one since the former is wasteful, except in the case of special types such as the Poumay and balanced-blast. When the top row is closed off the bottom row should be enlarged to provide a tuyere area from ¼ to 1/7 of the cross-sectional area of the cupola inside the lining at the tuyere level.

Use of large coke for the bed was recommended since the bed is determined on a volume basis, and the volume-to-weight ratio of large coke favors the weight. The committee also pointed out that while the figure for melting rate usually is quoted as 20 lb per minute per sq ft of cupola area, the actual aim should be at least 28 lb, and under good conditions that rate can be exceeded. Any increase in melting rate for a given cupola diameter generally is accompanied by a saving in fuel. Slow melting rates usually are associated with too heavy melting coke charges. At the same time slow melting often results in low tapping temperatures. In some cases it may be found possible progressively to reduce coke charges as melting proceeds and furnace walls become heated. It frequently is possible to reduce coke for the last charges of metal especially with non-steel mix cast irons.

Ideal thickness of the coke split usually is given as 6 in. and if the coke is comparatively small a greater weight of coke per split is required to maintain that thickness. In such cases economy in fuel consumption is possible by increasing the weight of the metal charge to correspond with the weight of the coke split. If the melting rate of the cupola is found to be less than that mentioned previously and particularly if the metal is dull, then the weight of the coke split is reduced progressively until a satisfactory melting rate is obtained, coupled with metal tapped at an adequate temperature.

Checklist Offered For Management

To assist the business executive who wants to make a critical survey of his company's management in the light of present-day requirements, the Policyholders Service Bureau, Metropolitan Life Insurance Co., 1 Madison Ave., New York 10, has issued a report, "Outline for a Management Audit." Essentially a checklist, the report breaks management into its major divisions of personnel, production, sales and general administration and asks penetrating questions about each.

The answers to these questions are intended to reveal any fundamental policies and practices which are now obsolete or inadequate, and may suggest steps to be taken to attain the degree of flexibility so necessary in rapidly changing conditions. A copy of this report is available to executives who request it on their business stationery.

War Assets Administration received no bids Oct. 7 for the $26,000,000 surplus cast armor plant in East Chicago, Ind., which American Steel Foundries built and operated during the war.

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CASTS THREADING DIES

In New Gray Iron Foundry

By WALTER RUDOLPH

TO ELIMINATE a production bottleneck resulting from difficulty in procuring small gray iron castings used in the manufacture of bolt and pipe threading dies, the Reed Mfg. Co., Erie, Pa., recently established a foundry department at its plant. The castings are somewhat of a specialty product in that the metal is poured into a mold containing the die's steel chasers; these chasers, which do the actual cutting of threads when the die is used, must be welded firmly and in proper position in the iron casting.

In addition to supply problems involved in having available daily about 2000 of these castings, the company's decision to make its own castings was motivated also by the desire to obtain a product having a stronger and more uniform weld between the chasers and the casting.

A 25 x 70-ft building annex at one end of the Reed plant was adapted for the molding, melting and pouring departments, with a smaller adjoining room used for core assembly. Cores are made from an aluminum pattern on the squeezer machine shown in Fig. 3. Some of the cores after baking are shown in Fig. 4; this view also illustrates how the steel chasers are pasted in place. The chasers vary in size from 5/32 x 23/32 x 7/16 in. to 1¼ x 1 x 9/16 in. Cores are made either four or eight at a time, although a 12-unit pattern is being developed.

Completed cores are hauled to the molding department where they are placed in molds made on a jolt squeezer machine, as shown in Fig. 2. After the molds are closed jackets are put in place, the molds are pushed down a roller conveyor to the pouring line and after being weighted are ready for pouring.

Melting equipment consists of a 150-kw rocking electric arc furnace of 500 lb capacity. This unit, shown in Fig. 5, provides the high pouring temperature—2800 to 2900 F—which is desired for these castings, as well as permitting close control over metal composition. The furnace has an easily removed shell, and

(*Concluded on page* 168)

Fig. 1—Pouring a mold on roller conveyor at new foundry of Reed Mfg. Co., Erie, Pa. Note support on which pourer rests hand ladle

Fig. 2—Placing core in mold preparatory to closing. Eight threading dies are cast at one time in this mold

Fig. 3—Making cores for the cast dies. Sand mixer shown at left

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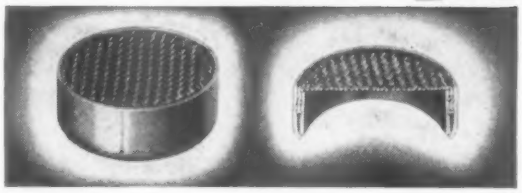
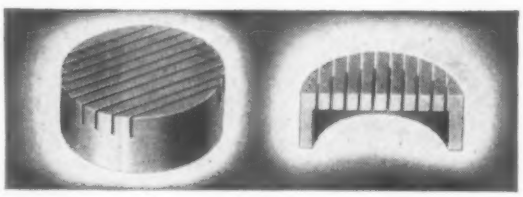


SCREEN TYPE—Patent No. 2,263,974

For HIGH-SPEED production. Made from 30 mesh monel screen lapped 3/16" over brass innertube and firmly secured with brass outertube, making a strong, fool-proof unit. Each vent is sized through a die assuring accurate fit. The compression between outer and inner tubes holds screen securely in place without slightest danger of blow-out. Costly work stoppages to repair or replace vents are eliminated.

Use Rienacker core vents (screen type) whenever possible—on all flat surfaces, and on curved surfaces wherever core marks are unimportant. You get fastest air escape with minimum liability of clogging.



SLOTTED TYPE—Patent No. 2,238,506

For CONCAVE and CONVEX RADII. Made of brass, precision slotted for greatest air escape possible with this type of vent. Standard slot width for cast iron .014; for brass .010. Core vent hole should be made with a step-drill so that bottom of vent rests on shoulder thus provided. This slotted vent is easily shaped to any curved surface; leaves no core marks on casting.

Write for information and prices on gas escape vent bushings for use with round or rectangular vent rods. Round bushings in all drill rod sizes; rectangular bushings: 3/32" x 1/4"; 3/32" x 3/8"; 1/8" x 1/4".

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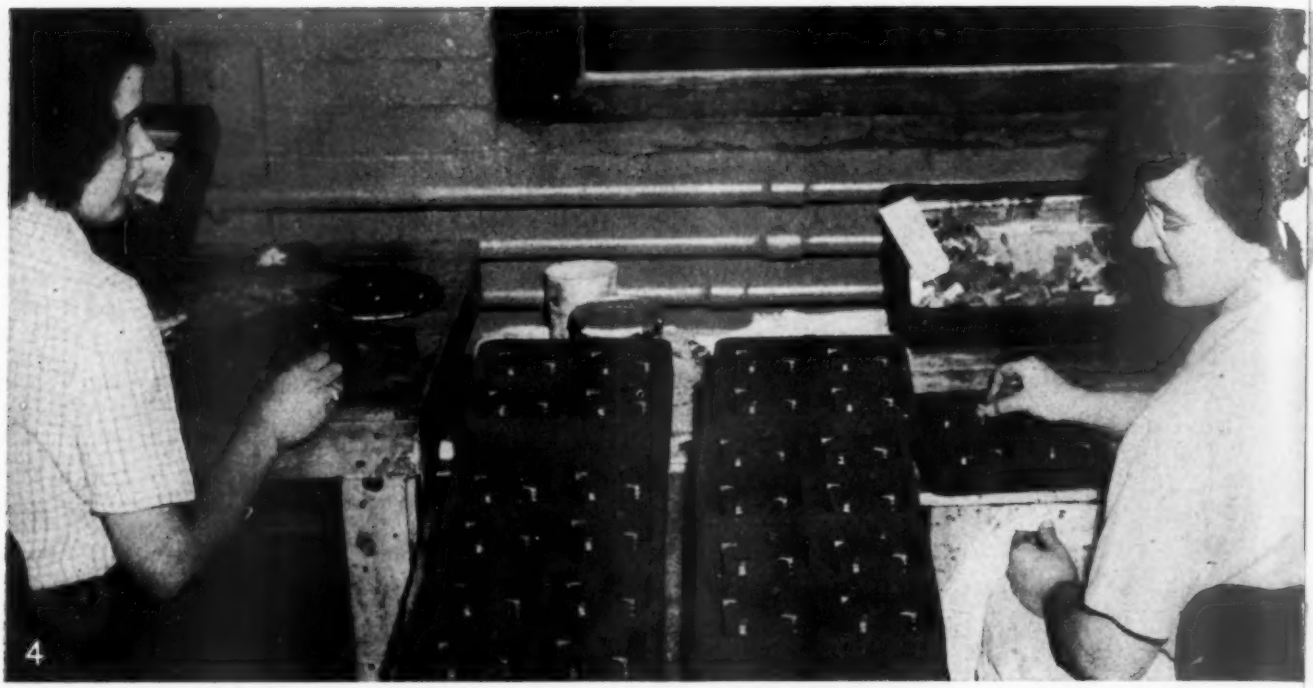


Fig. 4—Pasting steel chasers in cores. These chasers perform the thread cutting operation in actual use of the dies

(*Concluded from page* 166)

in the event of a burned-out lining a spare shell can be installed with only a brief interruption to production. The plant currently is making five heats during an eight-hour shift, the charges being about 400 lb per heat.

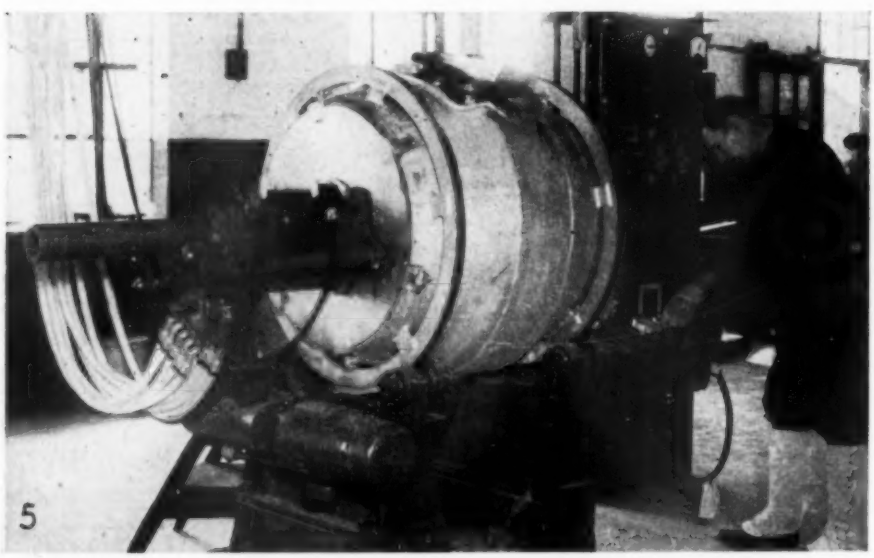
Charging of the furnace is accomplished by a hopper attached to an electric hoist which travels on a monorail. When the loaded hopper is positioned over the furnace door a two-section bottom is opened by a manually-operated lever at the side of the hopper and the charge is deposited. Since the foundry still is in early stages of operation various metal compositions, including different alloy additions, are being experimented with to determine the most suitable one. Similar development work has been undertaken on core sand mixtures.

The furnace is tapped into an insulated ladle which is moved over a monorail to the pouring line. Here the molten metal is transferred to a hand ladle and poured as shown in Fig. 1. To assist the operator to position the ladle more rapidly and to pour accurately, a bar fastened horizontally to the ladle shank is rested on two Y supports on either side of the conveyor line. After a mold is filled it can be moved on down the line without interference from thi pouring arrangement and another mol brought into position.

Solidified castings are broken out o the molds at the far en of the ro placed in a tumbling barrel for preli nary cleaning and finally taken to t machine shop for finishing.

Operating personnel in the foundry which is producing about 12,000 ca dies weekly, numbers seven—a man an two women in the coreroom and fou men handling the molding and pouring

Fig. 5—This 500-lb capacity electric arc furnace provides the hot metal for casting the gray iron dies



(Photo courtesy Detroit Electric Furnace Division, Kuhlman Electric Co., Bay City, Mich.)

Book Review

Management Techniques for Foremen edited by Richard W. Wetherill, 17 pages, 8½ x 11 in., ring type binde published by National Foremen's Insti tute Inc., Deep River, Conn. Price $7.5

A comprehensive picture of the fore man's job, presenting a broad classifi cation of his essential needs and duties the material is based on training session and springs from detailed study of meth ods actually used by successful produc tion foremen in handling daily work For foremen managing activities of group of production workers, the manua supplies sound answers to practical prob lems, tested by the experience of other and is a valuable source of ready refer ence.

Subject matter is presented under chapter headings: "Responsibilities," "In formation," "Lining Up a Job," "Intro ducing People," "Training," "Safety "Quality," "Costs," "Quantity," "Physica Property," "Working Conditions," "Man aging People," "Rate Problems," "Labo Relations," "Discipline," "Leadership "Co-operation," and "Advancement."

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GRAY IRON IN WAR AND OTHER EMERGENCIES

(*Continued from page* 91)

traced the looting of our manpower to other industries considered more important, as well as the scant consideration given our pleas for exemption to the all-powerful local draft boards and by those in charge of material and equipment allocation.

When experience had forced upon the industry the vital necessity to impress its importance upon the public, steps were taken to institute a publicity campaign through the press. News items were sent out to both local and national media all over the country in a constant stream.

The result was little short of miraculous. Doors that had heretofore been closed in Washington flew open, and when our committees and representatives appeared to plead the industry's cause they received a respectful hearing. To some extent it was "too little and too late," but publicity's value was proved beyond peradventure. And now that peace is restored there should be no let-up for a minute; the public should be kept foundry-conscious. This does not mean just the potential user of gray iron castings but every one who may or might affect legislation, controls or other matters affecting the welfare of the industry now or in the future. It should never again be permitted to lapse back into the unknown as it was before the war.

With the outbreak of the war in Asia orders for war materials began to pour into this country, and those in Europe who foresaw a general conflagration began to accumulate raw materials, among the most important of which were scrap iron and steel. First, in almost inappreciable quantities and gradually increasing to a deluge, scrap began to drain to both seaboards until the yards and docks of our ports were glutted with it.

Some far-sighted steel men saw the danger and took steps to arouse the others, including foundrymen. Meetings were held at steel centers to which gray iron foundries paid but scant attention. An appeal for funds to finance the campaign met with little response. "Why, when we need scrap, we simply call up our scrap man and it is delivered!" To say that it might run dry in this big country was just as absurd as to say that you couldn't send Willie down to the A&P for a pound of butter and a steak!

In Washington the attitude was that scrap was something the junk man collected in his cart and if we could sell it abroad all the better! Meanwhile every available foot of cargo space carried out this invaluable raw material east and west to Italy, Germany, England and Japan and it was the railroad yard congestion at our seaports, rather than the draining of our foundries and mills, that at last drew attention to the situation.

Then came the Office of Price Administration as a result of rapidly rising prices. It is not the belief of the writer that the *idea* was wrong. It was absolutely necessary. What was wrong was its overall coverage and a bill hastily thrown together by legislators who could not possibly foresee the interdependence of *all* industries and their far-flung effect, one upon the other. The government had a good opportunity to learn this interdependence during the NRA debacle just as the industry had its chance to learn the value of statistics and cost accounting, but neither had profited by the experience. The files of NRA were buried deep in the archieves and nobody even knew how many foundries were operating, let alone their output, value, payroll, consumption of raw materials, etc.

The personnel of OPA was composed largely of teachers, economists, New Deal hangers-on, etc. Their knowledge, such as it was, was derived largely from books based upon the handling of orderly, well arranged statistical data, and when it came to handling a great straggling industry composed of nearly 3000 small companies scattered all over the United States and whose figures, such as existed, were hopelessly entangled with those of other foundry industries, like steel, malleable iron, etc., they were lost. It is hardly fair to put all or any great part of the blame upon these men. They did the best they could with what they had and improvised the rest. The long years of New Deal politics had taught them to suspect the honesty of all employers and their associations. A supply of intelligent foundry executives to accept government service in the emergency simply could not be had. They were busy at their cupolas.

Department Classified Scrap

With the institution of piece control, scrap came first. While the Department of Commerce had undertaken an official classification of scrap some years before which was officially accepted and adopted by the foundry industries, its value had not been recognized and it had never been put into actual use. In ordinary times its only function would have been statistical and, since foundrymen did not use statistics, it was not employed. Each foundry had its own scrap dealer who understood his customers' requirements so that, so long as that relationship existed, all went well. It was only when an effort at price control was invoked its necessity was apparent.

It was practically impossible to write an all-embracing order without any uniformity of nomenclature. Those who attempted it did the very best they could and they collaborated closely with the trade associations concerned. The latter, in turn, were up against the same situation. The OPA officials did not even realize at first that gray iron foundries used steel scrap and had it not been for prompt action by the Gray Iron Founders' Society these foundries might not have been allotted their share of this material. This was particularly true of steel rail scrap. The rerollers were naturally out for all they could get, as were

(*Continued on page* 172)

FOR BETTER LIGHTING: Entrance to the Lighting Institute, at Nela Park, home of the General Electric Co. Lamp Department at Cleveland. The institute, closed during the war, recently was reopened following extensive rebuilding and has resumed its series of lighting "schools," which attracted nearly one million visitors between the two world wars. The new exhibits and training courses provide the latest information relative to lighting in industry, stores, homes, etc.

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1 Filling flask from overhead hopper

4 Inspecting a perfect cope

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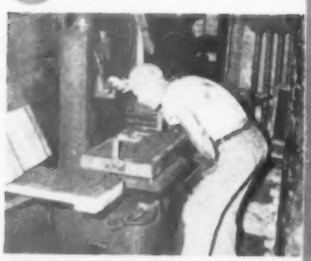
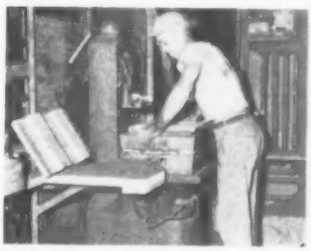


5 Setting the cores



3 Lifting off the cope

6 Placing finished mold on conveyor

DAVENPORT MACHINE AND Foundry Company
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(*Continued from page* 170)

also the steel foundries.

A rapidly taken poll of the gray iron foundries demonstrated that, while some of the more advanced metallurgists could forego the use of rails, there were hundreds of others who thought they could not. The society felt that a war was no time to make experiments so presented its claims which were accorded as full satisfaction as the narrowing supply permitted.

Next followed the price angle. Naturally this suffered from the lack of classification standards and anything approaching accurate figures on consumption by geographical areas. A price schedule was drawn up by the OPA as a starter but, lacking statistical data, unnatural courses of distribution were at once built up causing both price and allocation distress. Amendment after amendment was issued so that, in the course of many months of "cut-and-try," a workable order was finally arrived at.

In the gray iron foundry industry assistance was promptly rendered by its society calling meetings of foundry executives in 18 foundry centers throughout the country each of which meetings selected a representative by secret ballot. These representatives then met in Cleveland, and elected from their number a national committee to represent the industry before the OPA.

Selects Own Committee

While this process was ultra-democratic in its method of selection it consumed endless effort, valuable time and a large expenditure of money. Even then the personnel of the OPA was not satisfied and, despite its ignorance of the industry and those comprising it, selected its own committee.

This committee then organized, financed itself by public subscription and went to work. It held frequent meetings throughout the war and by this self-sacrifice earned, if they did not receive, the eternal gratitude of their fellow foundrymen.

Suggested means to avoid these difficulties in any future emergency will be found in the summary of this article. They are extremely simple and should be effective.

The difficulties experienced with scrap indicated that a like situation might be encountered with all supplies, so the Gray Iron Founders' Society sent out a very comprehensive questionnaire embracing all supplies consumed in the previous year and estimated requirements in the current year. The size of this questionnaire slowed up its return. The Bureau of the Census kindly offered to use its facilities to tabulate the sample when sufficient returns had been received.

These returns at once showed up a grievous fault, namely, lack of uniformity throughout the country in units of measure and the total disregard of those suggested in the questionnaire. Where gross tons were asked for replies came back in pounds, hundred-weights, net tons or gross. Sometimes barrels, gallons, quarts, etc. were used so that each of the hundreds of questionnaires had to be gone over individually and usually refigured into a uniform system. This consumed months of valuable time and increased inaccuracies. A copy of the tabulation was given to the predecessor of the War Production Board for a guide in estimating the industry's probable requirements.

Taking it by and large the WPB did a much better job than the OPA. Despite its importance the gray iron castings industry was incorporated into a Forgings and Foundry Section of the Steel Division, which was headed up by a steel forging expert.

The most important item at the beginning naturally was pig iron. Here we were more than fortunate. The pig iron allocation was placed under an iron expert and manned by pig iron salesmen of wide experience. They knew the industry and the industry knew them.

Before the allocation order was issued the Gray Iron Founders' Society appointed a committee to go over it and offer suggestions. It was at once apparent that it had been drafted by steel-mill men entirely unfamiliar with the tailor-made method of foundry operation. Allocation was to be made on the basis of backlog whereas very few jobbing foundries operate on any but a hand-to-mouth basis. Captive foundries can anticipate their operation but they form only a relatively small proportion of the industry's ouput.

This was immediately pointed out to the powers-that-be but they either did not believe what the committee said or else thought the matter of little importance and the order was issued as originally drafted. This was a poser and bid fair to deny pig iron to any but captive foundries.

The committee was called together at once and drew up a form of certificate based on the previous month's consumption instead of nonexistent backlog. The idea was that the foundry was to fill out this record of previous consumption and file it with the retained copy of its application for pig iron allocation and held subject to check by government inspectors. Either the instructions were badly worded or the foundrymen couldn't be bothered with so simple a scheme. Most forwarded the form with their applications. This caused endless confusion in the WPB because the form was entirely unofficial and, while its use had been discussed with the government and given an unofficial okay, neither side fully understood its function.

As stated before, however, WPB officials were most co-operative with the representatives of the trade association and, between the two, troubles were rapidly ironed out and the flow of iron to the foundries kept up with fairness and promptness. The government quickly understood that the trade association was on the level and paid immediate attention to its requests. This saved costly delays and millions of dollars to the foundries.

Still Floundering in Woods

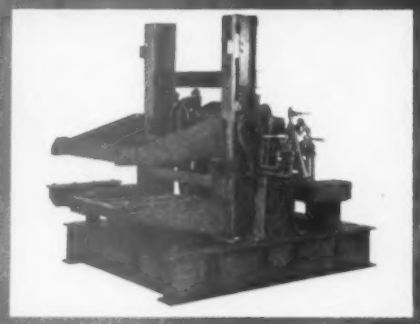
Today, as this is being written, another pig iron famine is being experienced. In one section of the country scrap was reported as having been bid up to as high as $40 a ton in an unsupervised market. It looks as though the foundries were not out of the woods yet.

Manpower was the next obstacle to raise its barrier to wartime production. This, insofar as the ravages of the draft is concerned, can be directly traced to the gray iron industry's failure to publicize itself in the past. Draft boards were drawn from every profession and trade. The industry, being composed of many hundreds of small plants, had not impressed its vital importance on those whose word was law as to who should be taken, and many key men were lost to foundries — many forever. An even greater drain came from the high wages and more pleasant working conditions to be found in the so-called war plants.

At the beginning of the war many high placed officials—many who should have known better—preached from the house tops that this was a steel, aluminum and magnesium war so that many gray iron foundry workers felt that continuing in an unnecessary or unimportant industry almost bordered on the unpatriotic.

(*Continued on page* 174)

NTERNATIONAL MOLDING MACHINES

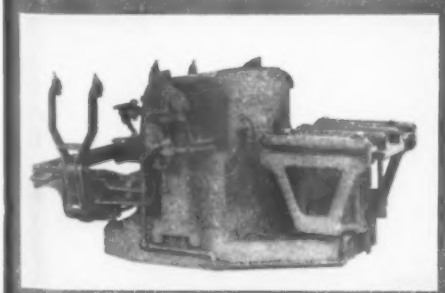
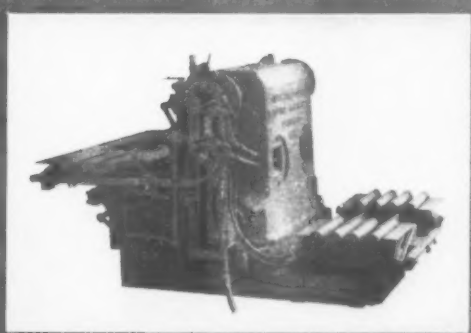


All of the 70 different types of standard machines that we build are made in a wide range of sizes. Each type is made in a variety of designs. The nine machines illustrated are representative of our line of

TURNOVER MACHINES

used extensively on *high production* work in combination with our various styles of JOLT SQUEEZERS and JOLT SQUEEZE HAND and POWER LIFT and STRIP MACHINES.

INTERNATIONAL Blowers are used in *high speed* shops for blowing cores weighing from 1 oz. up to 250 lbs. and over

NTERNATIONAL MOLDING MACHINE CO.

2608--2624 W. 16th St., CHICAGO, ILLINOIS

(*Continued from page* 172)

It was only when the need of gray iron for machine tools, followed shortly by engine blocks, ingot molds and a thousand other items demanding gray iron made themselves felt that the public began to become aware of the situation. Then came what was perhaps the most nonsensical effort at a remedy ever indulged in by men of prominence.

Although both the War Manpower Commission and the industry were well aware of the shortage of men suitable for or skilled in foundry work, other war agencies and, it is regrettable to admit, enough short-sighted foundry executives to lend credence, took up the cry that foundry work was hot, heavy, dirty, dangerous and underpaid. They thought that by raising wages they could attract men who simply didn't exist or lure them away from other and, in many cases, equally important war industries.

Even the government employment service took it up and many a man who might have sought employment in a foundry was warned away by such remarks as "You wouldn't want to work in a foundry, would you?"

By study of their previous wage surveys and data obtained from the co-operative U. S. Department of Labor, the Gray Iron Founders' Society was able to produce figures that would convince any but the most prejudiced that foundry wages stood up well in comparison with other industries. However, the fat already was in the fire and the flames were being fanned by the so-called "labor advisers" who were spotted in every department of the war agencies and interested only in wage advances.

The society, in co-operation with the War Manpower Commission, made a careful job study of foundry positions, their relative importance and numerical ratios. This was of great assistance but the men, for the most part, were already gone. Other industries suffered likewise. The next remedy resorted to was imported labor from the West Indies and Mexico. Foreign labor helped some but was far from fully meeting the situation.

Before the end of the war the shortage of gray iron castings became very serious and many consumers had parties out scouring the country looking for sources. The Gray Iron Founders' Society, by means of post card surveys, was able to act as a clearing house in bringing producer and consumer together. This was accomplished without disturbing long-standing commercial relationships by requiring the enquirer after castings to state from whom he previously purchased his castings. The foundry was then contacted, told that the enquirer was in the market and asked if there was any reason why he should not be served. This offered adequate protection and frequently kept the business from straying into substitute materials.

This about covers the major problems encountered for which definite solutions can be found. There were, of course, hundreds of individual combinations and permutations of these encountered which had to be straightened out, each in its own way, but these were the fundamentals. Now for the proposed solutions.

Publicity—In war and other emergencies first things come first. The public, not the foundry nor even its customers, is the judge. The public forms the draft boards, the government agencies and, in fact, all of officialdom. If it is unacquainted with the industry and its importance, the foundries will receive scant consideration just as they have in the past.

Only a small part of this public reads the trade and technical journals, hence

(*Continued on page* 177)

NEW NORTHWEST FOUNDRY PODUCES ALUMINUM CASTINGS

METALCRAFT Inc., one of the newer industrial companies of the Pacific Northwest, was incorporated in 1945 and currently is producing aluminum castings at its Seattle, Wash., foundry. The illustration shows a partial view of the Metalcraft plant, which has 10,000 sq ft of floor space. The company is headed by C. A. Kummeyer, former purchasing agent of raw material for Boeing Aircraft, and specializes in production of cast hub and wheel assemblies for heavy-duty trucks, although a variety of other types of aluminum castings also are made. Melting units, including three 250-lb company-designed oil-fired furnaces and one 1000-lb electric furnace, melt approximately 4000 lb of aluminum daily. Molds made on four jolt squeezer machines are placed on roller conveyors for pouring, while an overhead monorail system is employed in handling castings between departments. Not shown in the illustration are the pattern shop where wood patterns are made, the coreroom, and furnace for heat treating castings. The company has about 30 employees.

Question? Answer!

¶ *What is the strongest fire clay binder in America?*

¶ The answer is REVIVO BOND. It is not equalled by any other American fire clay in strength, or by any other type of clay in durability.

¶ Therefore, it goes further. You use less of it. As a result, your sand has higher permeability and higher flowability. The last cost is low. *So is the first cost.* For pleasing economy, use Revivo.

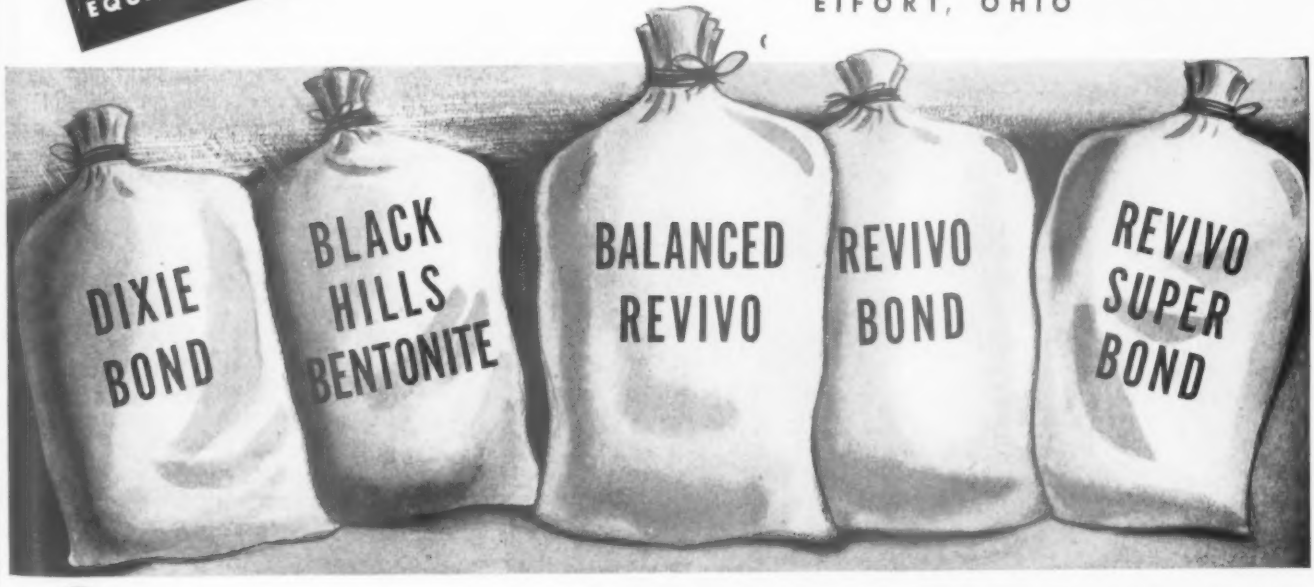
¶ *Not only so.* Revivo Bond is highly refractory, has a very high sintering point and very low contraction. Get our bulletin.

* * *

¶ If you want these qualities, you will standardize on Revivo. If your requirements are different, ECP will recommend, from five distinct lines (see list below), the one right clay or combination of clays for your job.

EASTERN CLAY PRODUCTS, INC.
EIFORT, OHIO

Remember
NO ONE BONDING CLAY WILL DO ALL JOBS EQUALLY WELL!



DIXIE BOND • BLACK HILLS BENTONITE • REVIVO BOND • REVIVO SUPER BOND • BALANCED REVIVO

ECP *All* TYPES OF BONDING CLAYS

A Foundry Sand Service Based Upon Practical Research

How do you tell which grit to use?

Very Coarse	Coarse	Medium	Fine	Very Fine	Powder Size
6	14	30	70	150	280
8	16	36	80	180	320
10	20	46	90	220	400
12	24	54	100	240	500
		60	120		600

Listed is a commercial classification of standard abrasive grit sizes. They come in a wide range... from 6 classified as very coarse to 600 classified as powder size. And, the variety is further extended by special sizes and combinations. Yet, each one is designed to do a specific job better than any of the rest.

To complicate correct choice even more, there is a long list of variable factors to consider. Among these, you'll find wheel speed, machine condition, specified tolerances, material analysis, related production schedules, and a host of others.

The correct selection hinges on the review which is given to all the controlling factors. Yet...grinding efficiency and economy depend on the right answer.

That's why the Carborundum Company has put together a practical program... a service now deemed essential by many concerns who have been successful in getting improved grinding in terms of better finishes, or at lower cost.

Your nearest contact to this service is a CARBORUNDUM representative You'll find him willing and helpful. Through a sound knowledge of abrasives and first-hand experience of their use and application in the many plants he contacts, he is able to make intelligent recommendations and suggestions. On the more uncommon problems, he can even call on our Abrasive Engineers who are more fully qualified to tackle the tough problems. And, sometimes, the answer comes from the modern laboratories at CARBORUNDUM—where scientists and technicians probe for new information on abrasives, practices and developments.

Here is a sound approach—not only to getting the right grit—but the right combination of grit, bond, grade, structure and all the other parts that make up a grinding wheel. *Plus* knowledge and experience invaluable in modern grinding methods and procedures. It's easy to use. It incurs no obligation. It makes sense. The Carborundum Company, Niagara Falls, New York.

A good rule for good grinding... **CALL IN**

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TRADE | MARK

BONDED ABRASIVES

WHEELS
- Silicon Carbide
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Cylinder Hones
Sticks, Stones & Rubs
Specialties

COATED ABRASIVES

Paper, Cloth and Combination
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ABRASIVE GRAINS AND COMPOUNDS

for:
Polishing
Lapping
Pressure Blasting
Finishing

"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company

(*Continued from page* 174)

it is necessary to reach it through the daily press. The foundry must be news. All matters pertaining to it of both local and national importance should be broadcast to the local and national press. This should be handled by a competent publicity man.

Advertising is of value to the individual foundry, but this medium is almost out of the question for the industry as a whole both by reason of the vast variety of adaptations of gray iron castings and the huge cost of effective national advertising. The foundry whose product finds its market in the machine tool industry could hardly share advertising with the producer of the humble sash-weight, automotive parts, pipe, pianos or thousands of other specialties.

Another thing to be remembered is that the publicity must not be sporadic. The industry through its trade association must keep everlastingly at it or the effect will soon be lost.

Materials—It would appear advisable that all industries consuming ferrous scrap should appoint scrap classification committees to meet with similar committees appointed by the Institute of Scrap, the U. S. Department of Commerce, Bureau of Mines and other interested government agencies. These committees could evolve classifications and specifications of scrap so that seller and consumer would know exactly what was meant in any statistical report or commercial transaction.

Should Collect Data

At least twice a year the industries concerned, through their trade associations, should collect statistical data on consumption by class and geographical area. Such data, accumulated through the years, would be an accurate guide of requirements in good times and in bad. There should never arise, as there did at the beginning of the last war, any question of what kind of scrap each industry uses and how much of each is normal and abnormal consumption. The geographical origin in normal times would permit those whose duty it became to allocate and price to follow the customary routing and investigate apparent abnormalities to ensure fair distribution.

Similar data on all foundry supplies should be periodically collected—at least once a year. But, before any questionnaires are sent out, foundry and suppliers' committees should meet together and establish uniform units of measure for each item. Just picture for yourself the guessing and work involved in examining and recomputing the hundreds of items included in such a list. And yet, should a list be in existence—up to date and of reasonable accuracy—the problem of supply allocation in time of emergency would almost solve itself.

Shortages of material due to exessive export, such as scrap in the prewar days, and restrictions of supply sources, such as pig iron in New England and elsewhere today, could be forseen and, where possible, guarded against before they became critical.

Price Control—What was probably the greatest bone of contention in the whole OPA setup was the rigidity of price control. The setting up of an arbitrary period between two dates as the normal upon which profits would be based was simply unworkable in an industry catering directly or indirectly to some five hundred others.

Lacking statistical data in the hands of the industry itself, the OPA set out to devise such data by hit-or-miss sampling or, as was often alleged, by pure guess. Again the industry's importance was not recognized by officialdom, so what difference did it make whether it prospered or was destroyed?

This ignorance was clearly demonstrated by the countless times the industry's trade association was asked to furnish the *average price*(!) of castings.

Repetition of such a situation in the future could be guarded against only by the companies composing the industry confiding their annual financial reports to a confidential agency for compilation and the universal adoption of sound cost accounting. To date the industry is far from being sold on either expedient.

Manpower—It is perhaps too optimistic to expect that the lion and the lamb will ever lie down together, but this country was not built on pessimism and there are already signs that the great labor leaders are recognizing that the vicious cycle of up-wages, up-prices, is thoroughly unsound from both the viewpoint of employer and employee.

During the terrific labor shortage that marked the closing months of the war there were many desperate employers who sought to reap a manpower advantage by boosting wages, failing to recognize that money will not produce men who don't exist and that the only way such raises could bring men to the gate would be by luring them away from other plants.

On one occasion when the foundry wage structure was vigorously attacked on the floor of the U. S. Senate by the exceptionally important senator from a foundry state, the writer, armed with reliable statistical data, called upon him to

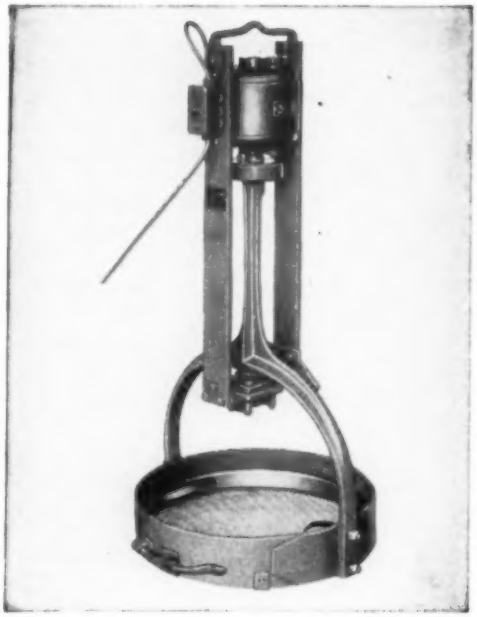
(*Continued on page* 180)

POURING LARGE WATER TURBINE CASTING

POURING of a 50-ton steel casting recently at the foundry of the Falk Corp., Milwaukee, produced the interesting picture reproduced here. The casting is a runner for a water turbine being built by Allis-Chalmers Mfg. Co. for installation at Mt. Shasta, Calif., and measured more than 15 ft in diameter. Metal from three open-hearth furnaces was required to pour the casting. The furnaces were charged with a total of 95 tons of metal and, with a melting loss of 7 per cent, provided a little more than 88 tons of molten steel when tapped simultaneously into three ladles. This gave a yield compared with metal poured of 56.6 per cent, or an overall yield of 52.7 per cent of metal charged. Three overhead cranes were needed to position the bottom-pour ladles over the mold, and an extension gate was required in pouring the contents of one ladle.

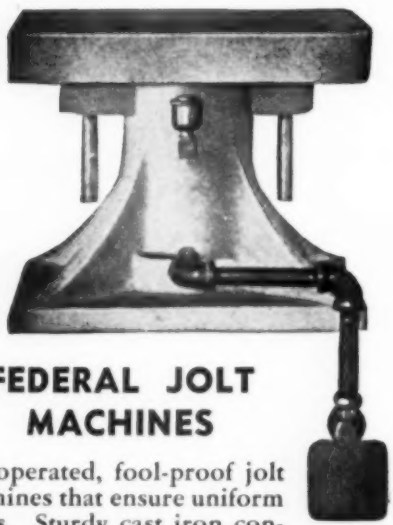
"All Federal Produ

FEDERALS



FEDERAL'S LOWE SIFTER

Save money by faster sifting, better sand conditioning with a Lowe Electric Sifter. Features: greater screening area, enclosed ball bearing motor, more shovelling room. Write for information. Prompt delivery.



FEDERAL JOLT MACHINES

Air operated, fool-proof jolt machines that ensure uniform cores. Sturdy cast iron construction with no external valves to wear out. Made in four sizes. Get our prices and deliveries.

RUBBER-COVERED SHOVEL HANDLES

The best insurance you can buy against damaged patterns, core boxes or flasks. The pean-shaped grip is ideal for ramming.

They will fit your present shovels or you can order your next shovels with them already installed.

The "Lightning" Clamp

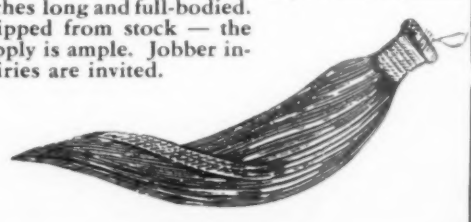
The "Holdtite" Clamp

Federal offers two types of flas clamps.
The "Lightning" clamp is an e centric type, requiring no wedg and available in two sizes: No. 8" to 12" and No. 3, 12" to 20
The "Holdtite" is an adjustab clamp designed for use wi wedges and is also offered in tw sizes: No. 1, 13" to 23" and N 0, 18" to 33".
Both clamps made of sturdy mall able iron, rigidly reinforced prevent distortion.

MEMBER

MANUFACTURERS ASSOCIATION INC. FOUNDRY EQUIPMENT

SWABS—We have eliminated the shortage of this essential item by making them ourselves. Federal swabs are made of the best flax, ample in size and won't fall apart. They're fully eighteen inches long and full-bodied.
Shipped from stock — the supply is ample. Jobber inquiries are invited.



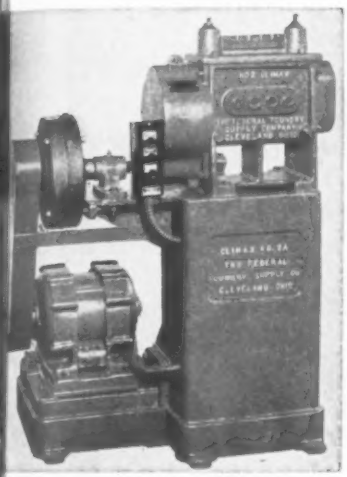
THE FEDERAL FOUNDRY

Seacoal Plant
CROWN HILL, W. VA. · CHICAGO · MILWAUKEE · DETROIT · ST. LOUIS

Chamberlain Co., Los Angeles, Calif. · Pacific Graphite Works, Oakland, Calif. · LaGrand Industrial Supply Co., Portland, Ore.

re Sold with Service"

SUPPLIES



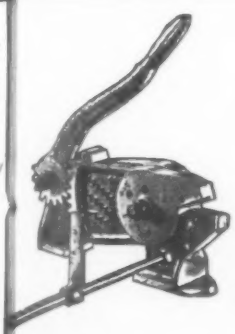
CLIMAX WIRE STRAIGHTENERS

ny foundry, large or small, an cut production costs by traightening and re-using ore wires and rods. With a limax Wire Straightener this an be done quickly, eco- omically, safely — by un- killed labor. A complete escriptive circular is yours or the asking.

"The Twist Does The Trick"

TWISTED STEM CHAPLETS

The chaplet with everything. The "Twisted Stem" promotes rapid complete fusion. Not deformed, the stem has no weak spot to burn in and permit core shift. Made in a complete range of sizes. Samples of the size you use, gladly submitted.

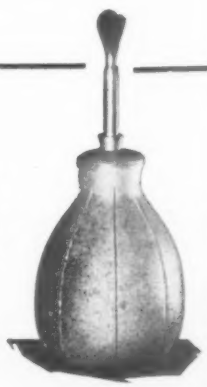


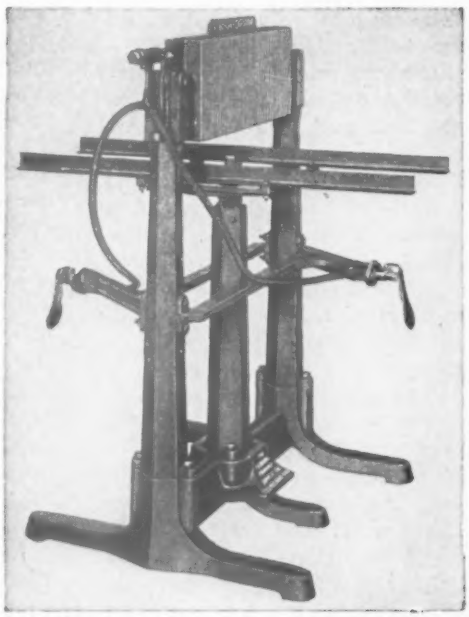
FEDERAL'S WONDER CUTTERS

Two compact cutters for rods and band iron. One cuts up to 5/8" round and the other to 7/8" round. Readily mounted on any bench. Users say they're worth their weight in gold!

WATER BRUSH

Easy to Grip and Hard to Tip. It can't leak and one filling lasts all day. Does not tire the molder's hand.



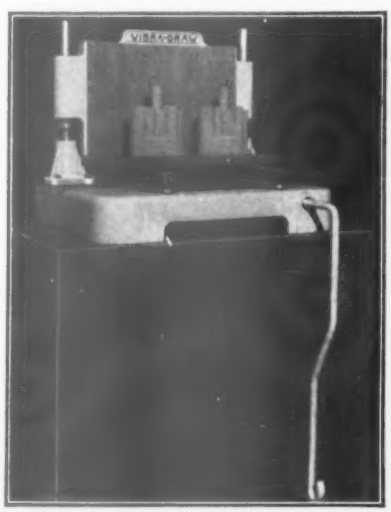


FEDERAL'S "VIBRA-DRAW" CORE DRAWING MACHINES

Cuts costs in your core room by making it easy for every core maker to draw perfect cores as fast as he can fill the core box, place it against the vibrating head and lift the box.

Made in two styles: the floor model shown above and the portable bench model below.

Immediate delivery—write for details.



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CHATTANOOGA, TENN. · ST. PAUL · NEW YORK · RICHMOND, VA. · UPTON, WYO. Mines

Beaumont Cement Sales Company, Houston and Beaumont, Texas and Harvey, La. • Shanahan's Ltd., Vancouver, B. C.

(*Concluded from page* 177)

protest. His excellency replied that he had acted upon the request of the foundrymen in his state—the employers—and could prove his words by their letters. Where did we stand with all our valuable and hard won figures? And yet our figures showed a very favorable wage comparison with other industries.

It may be of interest to note that on one occasion when the Gray Iron Founders' Society made a survey of wages, hours and working conditions, the U. S. Department of Labor made a similar survey.

To check the work of the society for his own satisfaction and information the writer took the society's figures to Washington to seek the criticism and guidance of the then head of the Bureau of Labor Statistics. To his great surprise and satisfaction it was found that the average composite wage for all jobs in the entire gray iron industry differed in the two surveys by exactly one-half cent! This, naturally, gave us considerable confidence in the work we were doing and in that of the government bureau also.

The government-sponsored slogan of "hot, heavy, dirty, dangerous, underpaid" has done such harm to the industry's reputation that it will take years to overcome it, but the challenge can and must be met.

Do not fear the result of wage comparisons. Our wage rates are sound in comparison with others. Extreme care should be taken to preserve truth and accuracy. One slip or effort to present anything but a factual picture might cause harm that it would take a generation to undo.

Everyone knows that accidents are not only distressing but costly to all concerned. Their prevention by strictly enforced regulations and safety appliances is the only answer to the accusation of "dangerous." Lifting apparatus can overcome the "heavy" proposition.

Perhaps the most difficult problem to be solved is that of "dirty". By eliminating it does not mean that sand and smoke must or can be done away with. It means good housekeeping which involves orderliness, lighting, ventilation, proper toilet facilities, in fact, all the factors that go to make pleasant physical working conditions. Some of this costs money but it pays dividends.

To sum up: In order to attract desirable employees, they must be fairly paid and work with modern facilities in an orderly environment. Nothing short of these requirements will satisfy this modern world.

If you have a shop to be proud of, an annual "open house" where the family and friends of employees as well as the public and press can inspect the plant will pay dividends in public relations.

Keep Accurate Roster

The roster of gray iron foundries in operation is constantly changing by reason of failures, fires, additions by building and purchase. Every effort should be made to keep this up to date and maintain in the office of the industry's national trade association a complete card index file of each foundry whereon should be entered a comprehensive description of the equipment and type of product of the plant. The need for this was emphasized during the recent struggle of the consumer to develop additional sources of castings for his products and repairs.

While the Gray Iron Founders' Society made every effort to act as a clearing house during this stringency it was greatly hampered by not having such complete detailed information.

Conclusion—In considering the foregoing study of cause and effect is it not apparent that, with the full co-operation of the members of the industry, it should be able to cope with any situation which may arise now or in the future with a maximum of efficiency and satisfaction to the foundry, its customers and the government?

In time of war or other emergency close co-operation between government and industry is not only advisable, it is absolutely necessary. But in peacetime, the interests of government and industry are at times at least so widely divergent as in effect to be diverse. It therefore behooves industry in its own interest to be prepared to attack or defend.

STARTS OPERATIONS SOON IN NEW FOUNDRY

WELLS MFG. CO., Des Plaines, Ill., expects to move its operations into its new plant in Skokie, Ill., before Jan. 1. Requiring additional space for manufacture of gray iron castings, the company some time ago acquired a 9-acre site at 7800 N. Austin Ave. in Skokie, on which it is now completing the brick and steel building, pictured here, to provide 43,000 sq ft. Total cost of land, building, switch track and other improvements will aggregate $275,000.

The new plant, which will incorporate modern design features and straightline production, will have facilities for 30 to 35 tons of castings per day, or double present capacity. Engineering Systems Inc., Chicago, is the architect-engineer, and City-Wide Builders, Chicago, is the contractor.

Company's products are valve lifters for gasoline and diesel engines, as well as other castings for the automotive, agricultural implement, heating and other industries.

A newly formed corporation, Wells Mfg. Co. on Aug. 1 acquired the assets, liabilities, facilities and personnel of the Chicago Foundry Co.'s Plant B at 1856 Miner St., Des Plaines. Chicago Foundry Co. will continue to operate its Plant A in Chicago as in the past.

M. K. Wells, formerly secretary-treasurer, Chicago Foundry Co., is president and treasurer of Wells Mfg. Co. Vice president is Harold W. Johnson, formerly associated with the Northwestern Foundry Co. and Greenlee Foundry Co., both of Chicago, and a past president of the Chicago Chapter, AFA. James F. Duffy is secretary and James T. Moore is purchasing agent. H. P. Wenzel, who has been acting as superintendent of the Des Plaines plant, will continue as superintendent at Skokie.

Stress Group to Meet

Annual meeting of the Society for Experimental Stress Analysis, including a symposium on telemetering of aircraft flight observations, will be held at the Hotel New Yorker, New York, Dec. 9-11. Inquiries should be addressed to the Society at P.O. Box 168, Cambridge 39, Mass.

You'll be hearing more about

AXIAL FLOW

. . . AERODYNAMICALLY DESIGNED TO ASSURE EFFICIENCY

The airfoil section vanes placed immediately behind the adjustable pitch fan blades on La-Del Fans straighten out the flow of air and permit building up high pressures and a uniform, quiet, smooth air flow. Greater efficiency and economy results as air can be conveyed faster with less power in La-Del Axial Flow Designs.

Let us show you how La-Del Axial Flow Fans can help with your future ventilation problems.

Quiet Operation
Uniform Air Distribution
Peak Efficiency
No Turbulence

LA-DEL FANS
TROLLER DESIGNED

Write today for catalog on LA-DEL Axial Flow Fans

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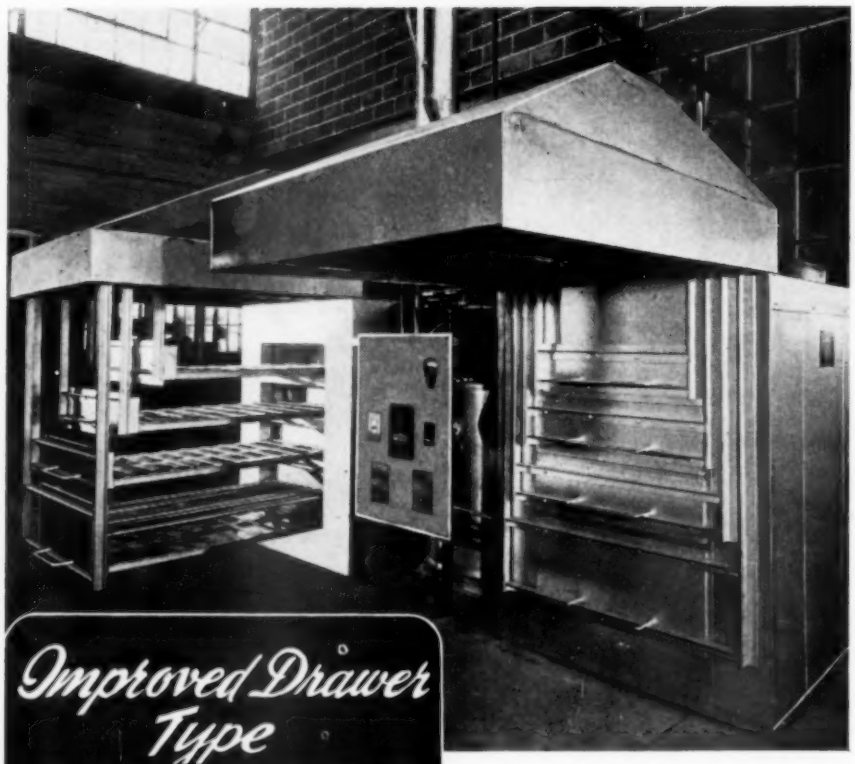

Note panel board mounting instruments which provide full automatic control of temperature.

Illustrated are two improved drawer type Lanly Ovens heated by a single air heater of the direct-fired atmospheric pull-through type with intakes for both fresh air and recirculated air.

These modern automatically controlled ovens assure economical operation, high efficiency and less breakage in baking cores.

One or more drawers may be opened at the same time—no cam levers or releases required—no jarring to cause core breakage. Each drawer is carried on ball bearing trolleys assuring easy, smooth and vibrationless action.

Full descriptive information available upon request. Write for it and the general Lanly catalog.

THE LANLY CO.
OVENS FOR INDUSTRY
HEATED BY GAS, OIL, ELECTRICITY OR STEAM
750 PROSPECT AVENUE · CLEVELAND, OHIO

STRESS CORROSION OF AUSTENITIC CAST IRON

(*Continued from page* 90)

required. Relationship of strain to stress not being constant, strain readings must be compared to a separately determined stress-strain curve to ascertain the corresponding stress intensities. The details of procedure and the various calibrations are described in Appendix I. The S-R strain measurements' accuracy compared very favorably with measurements by other extensometric devices, and results were readily reproducible. The facility with which these gages can be applied to locations and shapes where strains are measurable by other devices extends the field of testing engineering. S-R gage can be used not alone on simple test shapes but also on products and other complicated shapes subjected to stress and strain.

Tensile Tests Results—These are summarized in Table II and shown graphically in Fig. 6. The gray cast iron sustained a tensile load of 25,000 psi for 284 hours and 10,000 psi for 2600 hours without breaking. The solution discolored and the bars showed evidence of surface corrosion but there was no evidence of corrosion being accelerated by the stress, or suggestion that embrittlement was effected.

Austenitic iron failed in a comparatively short time under a load of 20,000 psi, 0.7 hours on one bar, 7.7 hours on another, both from the same heat. Decrease of stress to 12,000 psi increased the time to fracture by almost three times. At a stress of 10,000 psi load was sustained for 2600 hours without fracture. The curves indicate that there is a limiting stress below which failure will not occur in caustic solutions. This is confirmed by long time service experience with the condition and material. Above the limiting stress very slight increases in stress profoundly shorten the time of failure. This indicates desirability of suitable choice of design stress, and measurements under operational conditions to reveal same. Both of these factors are essential.

The tensile strength of Iron A cast as a 0.5-in. diam specimen was 38,500 psi. The specimen removed unbroken after 270 hours in hot caustic under a stress of 11,000 psi was subsequently broken at room temperature and showed a tensile strength of 37,900 psi. A piece of the test specimen which failed after 43 hours at 12,000 psi was broken at room temperature giving a tensile strength of 38,600 psi. It would appear that the

(*Concluded on page* 184)

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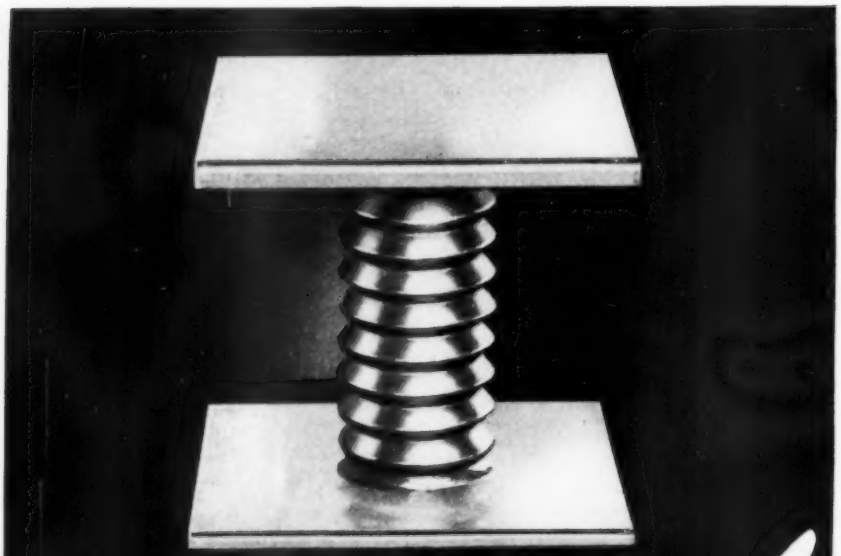

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The Milwaukee Double Head, Thread Stem Chaplet, pictured above, represents but one of the advancements in chaplet design represented in the *Milwaukee Line* of "Vital Details". It includes Standard Radius Chills, Schmitz Chaplets, Patented Adjustable Radius Chills, Special Chaplets and Related Specialties. Write for Samples and Prices.

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(*Continued from page* 182)

caustic is only effective in lowering the time to fracture under stress when material is under the corrosive and temperature influence.

Beam Loading Results — Results obtained from beam loadings of specimens are recorded in Table III, and plotted in Fig. 7. The upper curves show the tensile fiber stress as calculated from the beam formula, the lower from conversion of actual strain measurements according to the method described in Appendix I. The marked error occasioned by use of the beam formula is evident. These results are in good agreement with those found for tensile loading, the limiting or threshold stress being about 10,000 psi.

Conclusion — The studies cited here show that for the corrosive action and temperature considered there is a limiting stress below which the effects of stress-corrosion on austenitic irons are either negligible or nonexistent. This stress is relatively high in respect to contemplated stresses for cast iron products. Thus the good corrosion resistance of these metals in hot caustic can be advantageously utilized as sound engineering practice. This confirms field experience.

As shown by these studies and described in Appendix I the S-R resistance strain gage method is a valuable tool for the metallurgist and test engineer in their evaluation of quasi-elastic materials.

Appendix I

The preceding report indicates the necessity of correct stress evalution in studies of stress-corrosion effect.

Stresses due to tensile loading are determined readily and directly. Those due to various transverse loadings are not so easily determined. This is especially so in case of quasi-elastic materials, such as cast irons, where the premises of beam formulas do not apply, and strain measurements by conventional extensometric devices are not readily made.

SR-4 resistance type strain gages were used to determine the strain readings for the transverse loading of the stress-corrosion tests. To check the accuracy and sensitivity of the SR-4 strain gages a steel tensile test specimen was made long enough to accommodate an Olsen extensometer (3 in. gage length), a 13/16-in. SR-4 strain gage and a ⅛-in. SR-4 strain gage. Simultaneous readings of strains and applied load were taken. The results shown in Fig. 3, show good agreement, expecially when it is borne in mind that different gage lengths are involved.

A typical tensile stress-strain curve for austenitic cast iron is shown in Fig. 4. Four SR-4 strain gages were mounted on a specimen as shown in Fig. 8 and the specimen was subjected to simple

(*Concluded on page* 186)

how . . .

is your foundry planning to meet its problems?

There is only one way to prepare for the inevitable competitive conditions ahead—that is to plan for them—*and follow the plans with action.* Busy foundry executives may appreciate the fact, but they say: "easier said than done . . . we haven't the time, the manpower, or the varied experience to handle the job."

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(*Concluded from page* 184)

loading in the set-up shown in Fig 2. The applied loads were converted to stress as indicated by the beam formula and plotted against the corresponding strain. The apparent moduli by beam formula fiber stress versus strain are considerably higher than those obtained from tensile stress-strain data, especially at higher stresses. This emphasizes the fact that beam formula stresses deviate considerably from the true stresses.

The stress-strain data shown in Fig. 8 were obtained on as-cast specimens not subjected to previous stressing. Cast irons are quasi-elastic materials. Therefore stressing will result in plastic deformation and alter the stress-strain characteristics of the material. When strain determinations on a quasi-elastic material are converted to stress, it is imperative that the stress-strain data used in the conversion be obtained on material of similar prior stress history.

Sponsors Exhibit of Photomicrographs

American Society for Metals will sponsor a competitive exhibit of photomicrographs at the National Metal Congress and Exposition, Atlantic City, N. J., during the week of Nov. 18. Prizes will be awarded in ten various classifications and a special grand award certificate will be made for the best photograph in the show. A blue ribbon and an ASM book will be awarded the photograph judged best in each class. Honorable mention and an ASM book will be awarded other photographs closely approaching the blue ribbon winners.

Blue ribbons will be awarded for the best micrograph in the following classifications: Cast iron; carbon or low-alloy steel; stainless or heat resisting alloy; aluminum or magnesium alloy; other nonferrous alloy; weld structure; best micrograph in natural colors; best micrograph using penetrating rays (nonoptical) or other unconventional technique; best macrograph (10 diam or lower power) showing structure however developed (flow lines in forgings, ghost lines in plates, ingotism, casting defects, etc.); and best series showing transitions during phases or composition changes during manufacturing processes, during plastic deformation, etc.

Entries suitably identified are to be delivered to the ASM Metallographic Exhibit, Municipal Auditorium, Atlantic City, N. J., not later than Nov. 12. Exhibits will be returned to owners.

Ability Pattern Works, 756 Florence Ave., Los Angeles, is being operated by Charles Primack and Clarence Haack.

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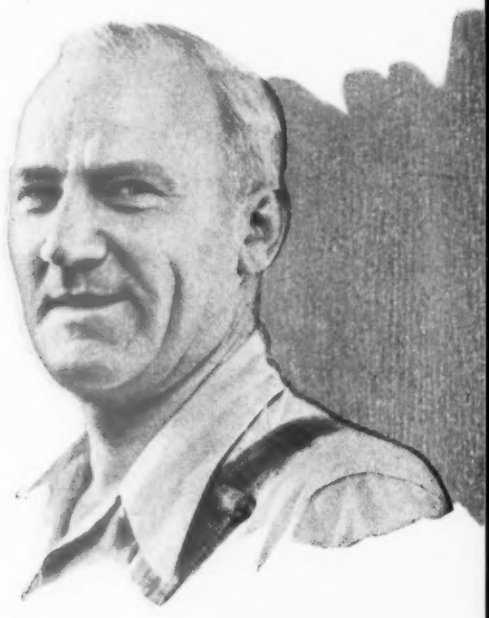

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CLEANING COSTS IN A SMALL GRAY IRON FOUNDRY

(*Continued from page* 83)

Some members of this group prefer to use an overhead rate per direct labor dollar instead of overhead cost per hour. There is an advantage in using the dollar basis where piece work is employed, as it eliminates timing the jobs. However, where labor payment is based on hourly wage, the jobs must be timed to form a basis for employee pay. The job time thus available makes it just as easy to apply overhead as by using a percentage of direct labor. For example:

Direct Labor × Overhead Per Cent = Overhead Cost. Time × Overhead Cost Per Hour = Overhead Cost. One multiplication in either case.

Many foundrymen of this group (the author included) use the following formula for arriving at the cost of tumbling castings: (Tumbling Labor + Tumbling Overhead) ÷ Pounds of Castings Tumbled = Cost Per Pound. Weight of Casting × Cost Per Pound = Cost of Tumbling.

The use of weight as a basis of arriving at tumbling costs may be justly questioned when we know that the shape, size and texture of castings vary to such a degree that:

1. More castings of one type than other *of the same weight* can be put into the tumbler at the same time.

2. The time required to tumble is influenced by the size, shape and texture of the castings.

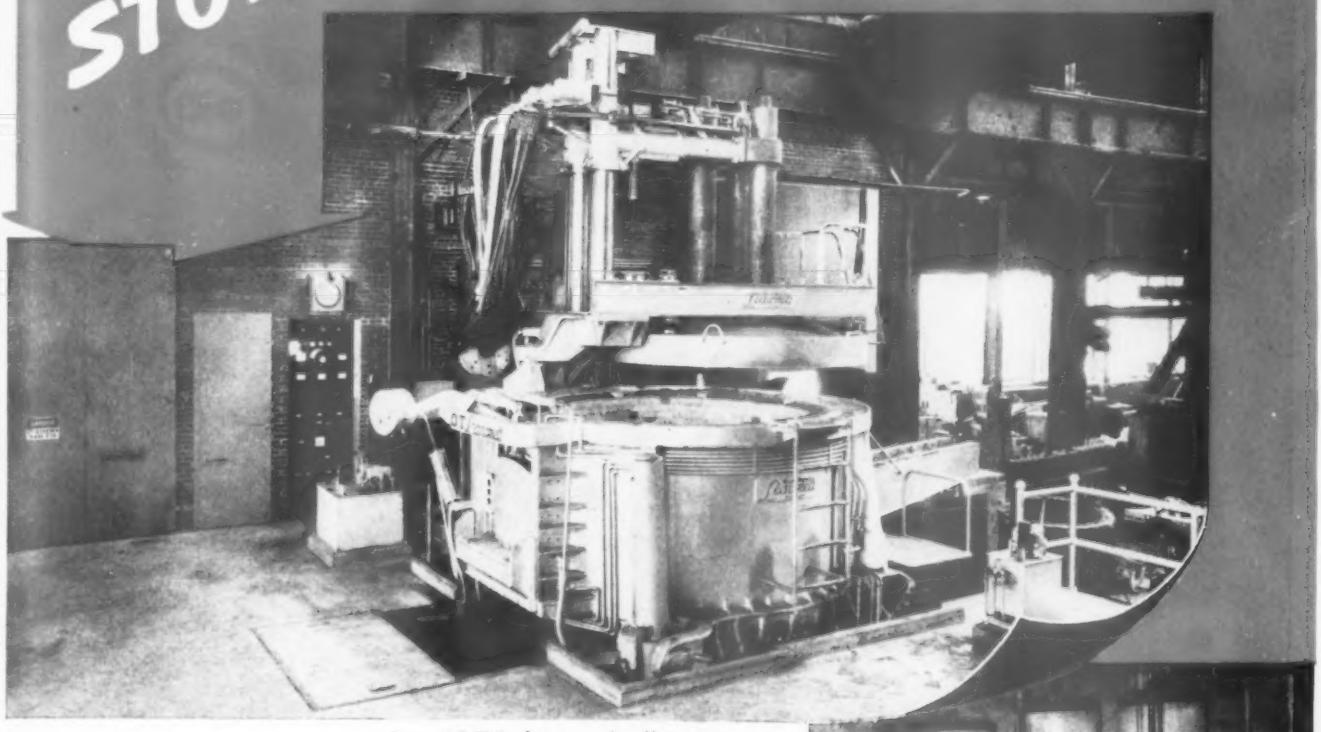
3. Some castings must be carefully packed in the tumbler, others may be dumped or shoveled into and out of the tumbler.

Where there is a difference of opinion as to methods of arriving at dependable costs it is well to apply the principles on which the different methods are based to a specific case. The basic data used in this study were taken from actual records of a normal day's operation in a small gray iron foundry making a variety of sizes and shapes of castings. This organization is what would be generally called a small heavy foundry with little modern equipment. Like many other such heavy foundries it makes many small and light castings. To protect the identity of this company, pattern numbers are omitted and plain numerals used to indicate the 36 different jobs. The time and weights are actual.

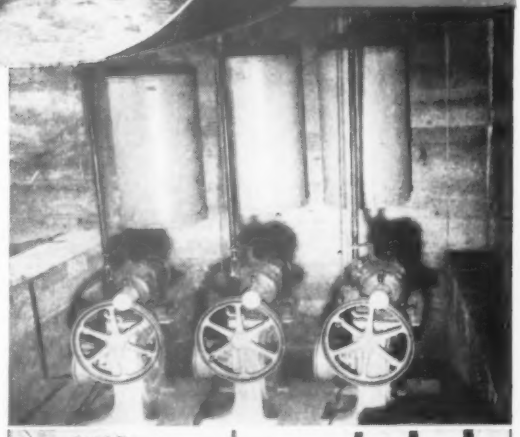
The first procedure is the determination of the daily cost to operate the cleaning department, as shown in the

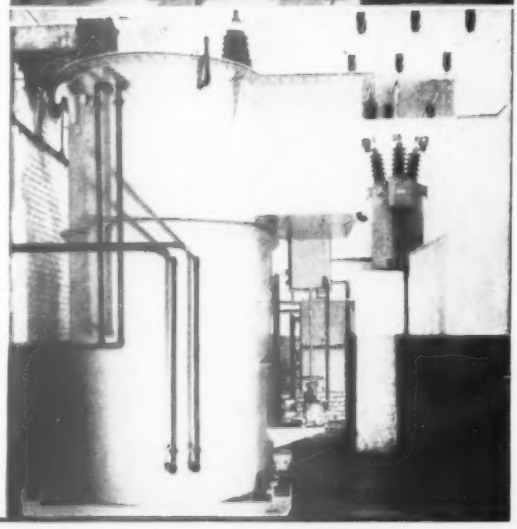
(*Continued on page* 191)

THE INSIDE STORY OF MOORE RAPID *Lectromelt* FURNACES MELTING ECONOMY



Size "O T." Lectromelt Furnace with roof swung aside in charging position.





The saying, "There is more than meets the eye," is especially true of a Lectromelt Furnace. The 50% of the equipment that is out of sight in the Transformer Room is also responsible for the large savings in power and electrodes and the precision quality control of a Lectromelt. The special Lectromelt transformer equipment and patented counterbalanced winch system are the major factors in the inside story of melting economy.

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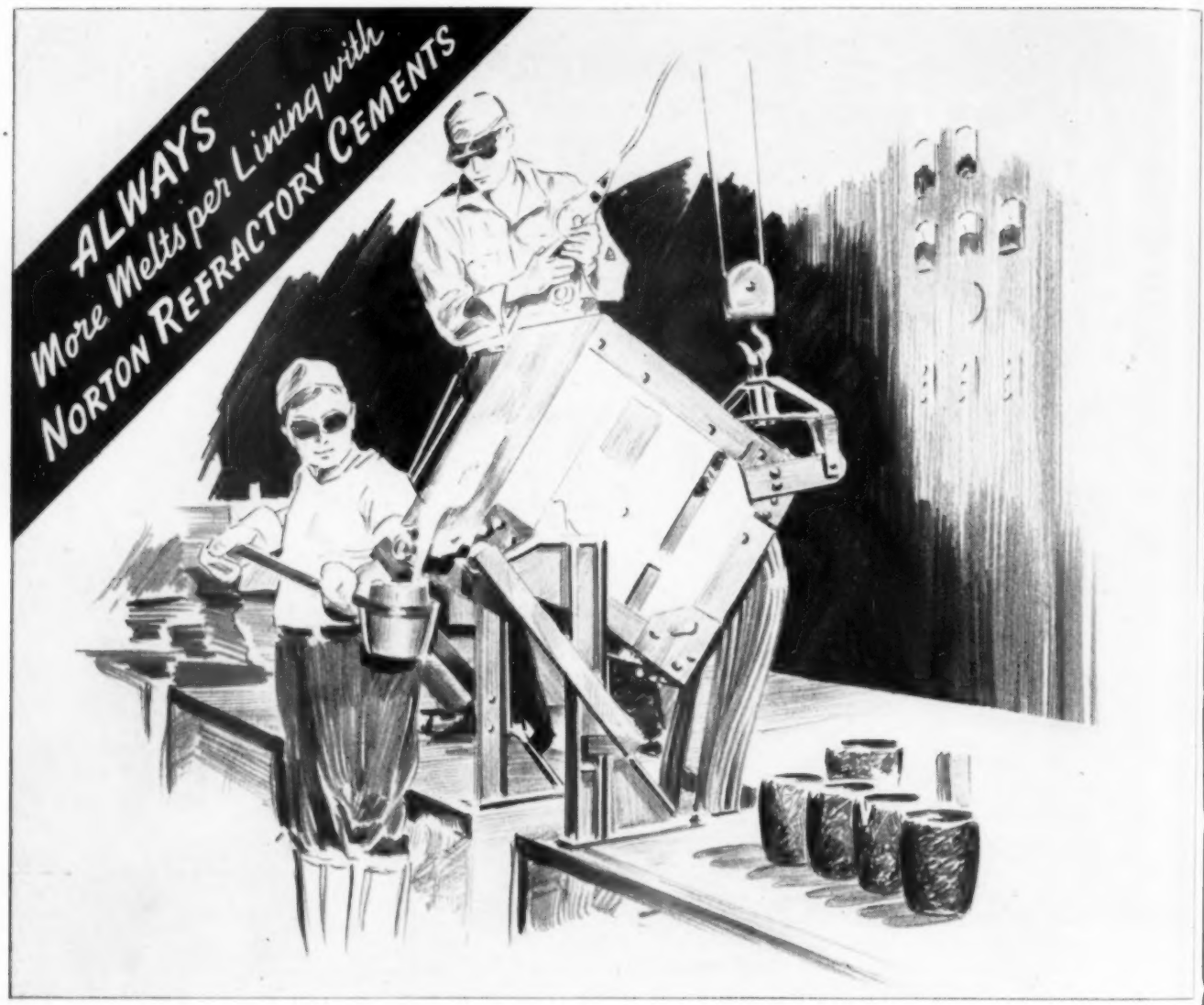

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(*Continued from page 188*)

table on page 83. The number of men actually employed were: two tumbling castings; nine grinding, chipping and sand blasting; two truckers; one superintendent; one office clerk (woman); one shop clerk.

There was a slight difference in wage rates to the going rates in foundries so an arbitrary rate is used in this presentation. Salaries of the superintendent, foreman and clerks were not disclosed. Reasonable substitution is satisfactory for the purpose of this study. Assuming the superintendent's salary to be $500 per month, one-fifth of his activities chargeable to cleaning castings, $100, is thus included with the $200 monthly salary of the cleaning department foreman; the resulting $300 is then divided by 20 working days in the month to determine the daily cost of $15. Two dollars and thirty cents is considered a fair charge for supervision of tumbling and the balance, $12.70, charged to chip, grind and sandblast operations.

Wages of the truckers, $14.40, is allocated on the basis of the operator's hours, $2.70 to tumbling and $11.70 to chip, grind and sandblast. The salaries of the two clerks are treated in a like manner to supervision. Total wages and salaries for each class of operation is obtained to form a basis for figuring employees' taxes, insurances and other labor expenses, such as paid vacations, welfare, etc.

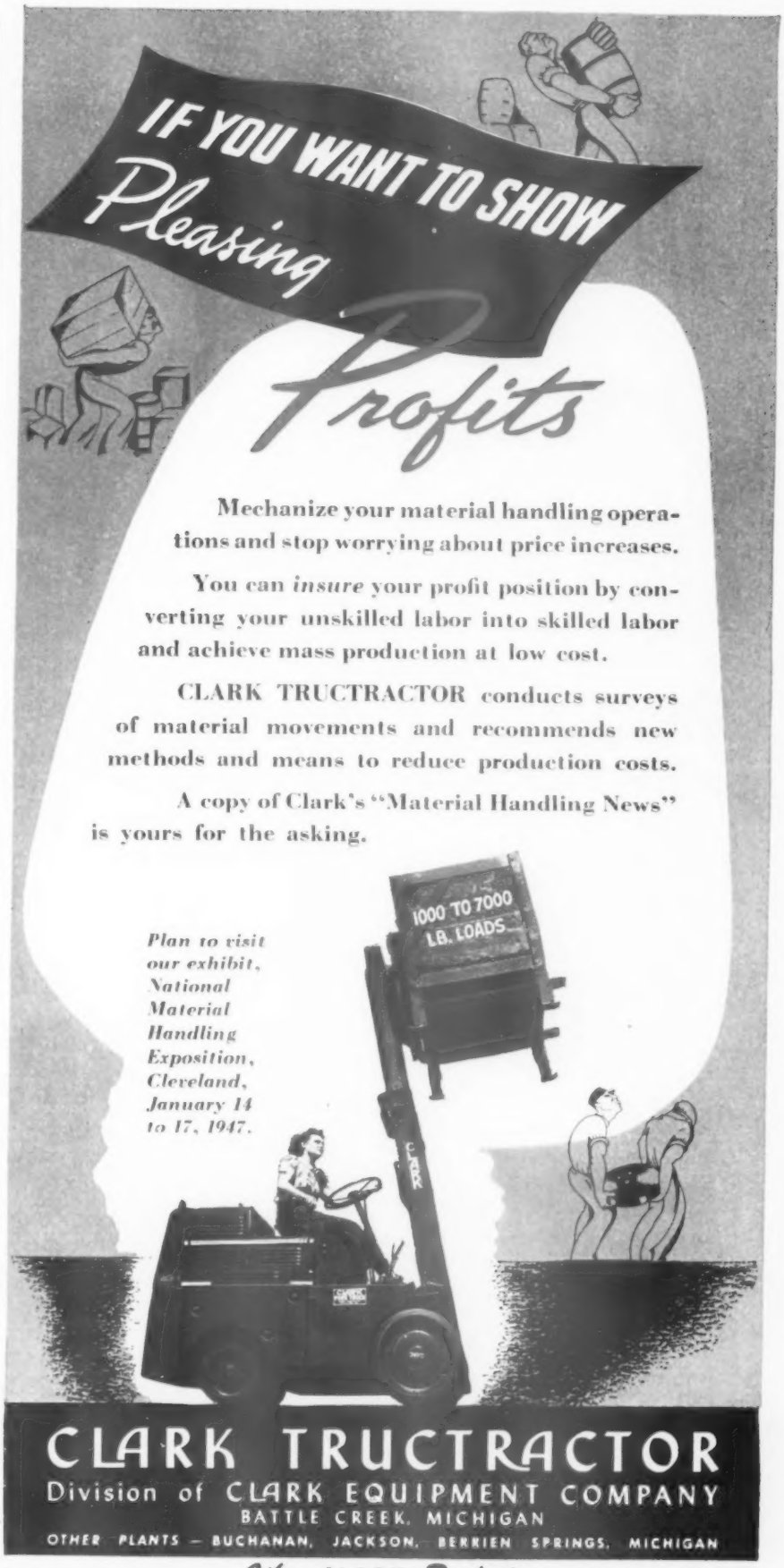
Includes General Expense

Depreciation includes provisions for the occupied portion of the building and equipment actually used in cleaning castings. Property taxes and insurance are the portion of these expenses chargeable to cleaning operations, based on building end equipment values used. Cost of heating the department is the proportion of the total heating cost that is required to heat the area used in cleaning castings.

Electricity is purchased for two purposes—to light the building and for power to operate the equipment. No separate meter being used for lighting, it is necessary to estimate the portion of the cost of electricity used for that purpose and allocate a portion to the cleaning department on the basis of area lighted, a portion of the balance of the cost of electricity being allocated to power for tumbling and a portion allocated to chipping, grinding and sandblasting. This segregation is based on horsepower-hours, horsepower-hours being the rated horsepower multiplied by the hours operated.

Maintenance, repairs and supplies are estimated from records maintained by the company which furnished the data for this publication.

Having determined a reasonable daily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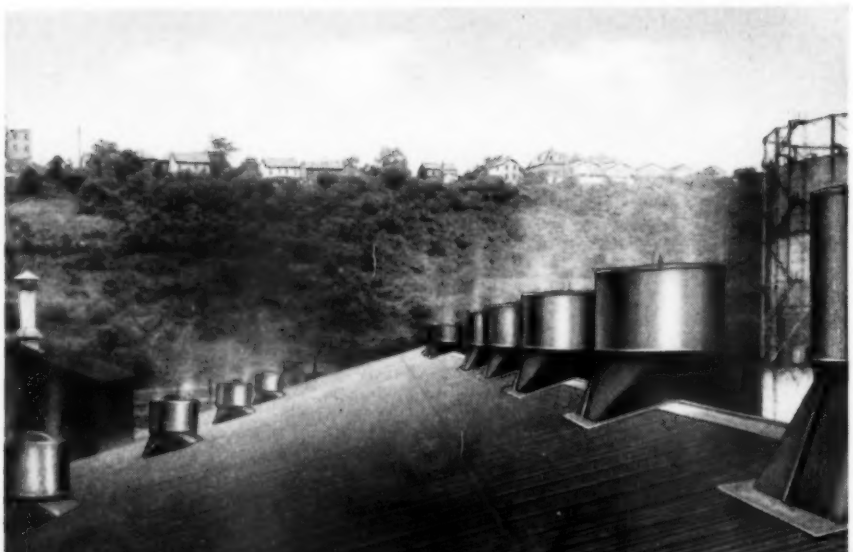

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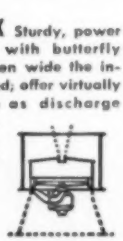

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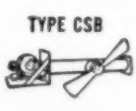

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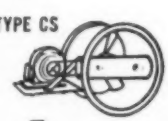

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cost of the several elements of cost of cleaning castings and recorded them on the schedule shown in the accompanying table we find the total to be: Tumbling—$57.11; chip, grind, sandblast — $124.51, or a total of $181.62. This total divided by the weight of castings cleaned, 16,707 lb, gives $1.09 per 100 lb.

As stated before, where there is a difference of opinion as to methods of arriving at dependable costs it is well to apply the principles on which the different methods are based to a specific case.

Let us first consider basing cleaning cost on a weight basis as compared with the job costs on a measured time basis (See Fig. 2). The first column on this chart indicates the job number assigned to each of the 36 patterns. The second column shows the weight of one casting. The scale at the top of the chart represents cost per 100 lb cleaned. The black horizontal bars indicate the cost per 100 lb when applying tumbling costs on the basis of weight tumbled and chipping, grinding and sandblasting on the basis of actual cleaning time. The formula for arriving at these costs is:

$$\frac{\text{Tumbling (Some castings not tumbled)—Daily Cost ($57.11)}}{\text{Pounds Tumbled (15,503)}} = \$0.368 \text{ per 100 lb.}$$

$$\frac{\text{Chip-Grind-Sandblast—Daily Cost ($124.51)}}{\text{Hours applied to jobs (64.4)}} = \$1.93+ \text{ per hour.}$$

For example, Job No. 1:

Weight of one casting	1.7 lb
Castings cleaned	72
Total weight cleaned	122 lb.
@ .368 per 100 lb.	$0.45 tumbling cost
Time to grind and sandblast	.6 hr
@ 1.93 per hr	$1.16 cost
Tumbling Cost	$0.45
Grind and sandblast cost	$1.16
Total cleaning cost	$1.61

$$\frac{\text{Total Cleaning Cost ($1.61)}}{\text{Castings Cleaned (122 lb)}} = \$1.32 \text{ per 100 lbs}$$

The red perpendicular bar indicates the $1.09 per 100 lb cleaning cost of each job when based on weight cleaned. Comparison of results of the two methods is convincing proof of the advisability of figuring cleaning cost on the basis of cost of time to clean each separate kind of casting rather than employing the apparent easier method of an average cost per 100 lb on all sizes, shapes and textures of castings.

As mentioned before, some foundrymen include the entire cost of the cleaning department in the molding overhead. The chart shown in Fig. 1 demonstrates that there is sufficient variance in job costs between results of this method and costs on the measured time basis to prove the unreliability of the former method. In order to use the molding labor basis method effectively there

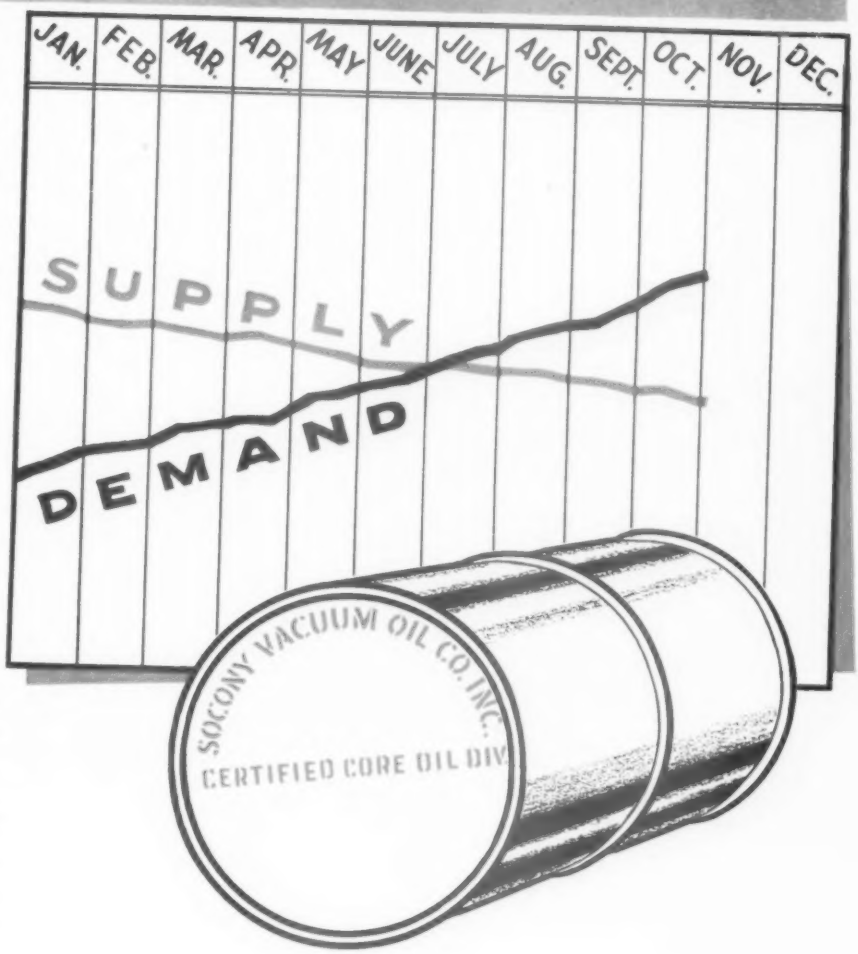
(*Concluded on page* 194)

SUPPLY AND DEMAND—THE FACTS ARE OBSTINATE!

Various drying oils are essential to the production of core oil. Because of international difficulties, shipments of linseed oil from South America have been greatly curtailed for many months. Perilla and other vegetable oils from the Orient were cut off before the start of World War II. Government regulations prohibit use of edible oils for core oils. Our industry is faced with a critical shortage. How long it will last is an uncertainty.

Prices are up and may even go higher. On the international market, imported linseed oil is much higher than our O.P.A. ceiling. If foreign supplies are to keep coming in, present ceilings may be raised. Regardless of the price, world supplies are shorter than they have been for years. There will be no relief in sight until after the 1947 harvest.

In the face of dwindling supplies, demands for core oil—at least Certified's brands — are unprecedented. We are sincerely endeavoring to meet the emergency. Some foundries that have wanted to switch to Certified, may not be able to get the quantity they desire just yet. We intend to be as helpful as possible to all concerned throughout this crisis.



3 Ways to Help the Situation:

1 **Don't use more core oil than the minimum amount possible in your mix.**

Many foundries use too much rather than too little core oil, on the theory that extra core oil will give a stronger core. Actually, excessive core oil tends to make softer cores; they require longer baking and smoke excessively. You're safest using a minimum of the best core oil your job requires. It was always economical to conserve core oil—*now* it's necessary!

2 **Anticipate your requirements.**

Don't wait till you are down to your last gallon before reordering, regardless of the make of core oil you use. If many foundries let their supplies run too low, it further complicates the situation. In fairness to other foundries, don't store more than you can use in a reasonable period.

3 **Drain containers before returning.**

Whether you buy core oil by the barrel or by the tank car, be sure to drain every drop. The "cupful" frequently left in a barrel would be enough for the mix required to make extra cores.

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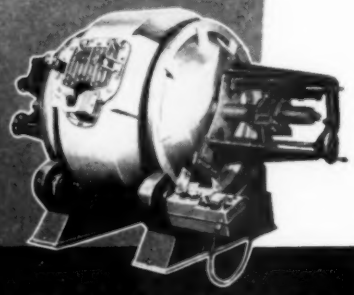
NEW Experimental and production type NP 10 kw, 10 lb. Detroit Electric FURNACE

The new Type NP, 10 Kw, 10 lb. Detroit Rocking Electric Furnace was designed to facilitate production of small pressure castings, by the "investment" or "lost wax" process. An adjustable, quick-acting device clamps molds to the furnace pouring spout for receiving molten bronze, iron, or alloy steel direct. Fast and clean, this furnace melts 6 lb. heats of brass in 6 minutes; 6 lb. heats of alloy steel in 15 minutes. A spare shell with pouring spout can be installed for experimental work or for conventional casting. The self-contained power unit is equipped with a 17 Kva, high-reactance transformer and control panel to afford the operator quick, positive control over time, temperature, and other melting factors. Detroit Electric Furnaces are made in various types, with capacities from 10 to 8000 lbs. Send us your melting requirements. We will be glad to recommend the specific Detroit Electric Furnace which will speed quality metal production in your plant.



DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY, MICHIGAN

(*Concluded from page* 192)

must be a uniform relationship between the molding labor and the time to clean all castings produced. This condition does not happen in a jobbing foundry.

It is hoped that the study of the charts and written explanations of them may assist some foundryman to analyze his own cleaning operations. By so doing he may discover irregularities in his method that, if corrected, would lead to more accurate costs which is the foundation on which to establish a selling policy for each job. This selling policy being the indication of when to accept and when to reject business. He may also discover, as many other foundrymen have before him, the additional clerical effort to be justifiable.

STEEL CASTINGS PRODUCED CENTRIFUGALLY

(*Continued from page* 81)

which is bolted to the casting machine table at the hinge line, is closed and locked with three lock bolts located at the middle and near the top and bottom. The pouring ring or sleeve is set over the sprue opening, and the cast steel cover plate is put in position on top of the mold assembly and locked to the hinged jacket, as may be observed at the right in Fig. 1. Before pouring an additional protection is provided by setting over mold and machine a portable circular steel shield. The shield also covers the top of the mold except for an opening through which the molten metal is poured. In operation the molds are rotated at around 100 rpm and metal poured in. As soon as the mold is full the machine rotation is increased to full speed which will depend upon the size of the casting and whether its mass is around the axis of rotation (true centrifugal) or some distance from it (centrifuging). After a few minutes the speed of rotation is cut to about one-half and when the metal freezes, the power is shut off.

While the Youngstown Alloy Casting Corp. specializes in wear and heat resistant alloy castings, it also makes plain carbon steel castings, mainly as an accommodation to its customers. In addition to use of the centrifugal casting process, certain types of castings are cast statically. Steel for castings is melted in a 1000-lb capacity direct arc electric furnace shown in Fig. 7. The firm also has a small 250-lb furnace which is used for experimental work or for special heats.

In producing castings statically the same care is taken in finishing the molds as in the case of those made centrifugally.

(*Concluded on page* 196)

Advertisement

NOVEMBER, 1946

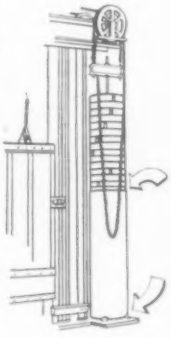
R-S FURNACE FACTS

ISSUED MONTHLY BY R-S PRODUCTS CORPORATION, PHILADELPHIA 44, PA., FOR THOSE CONCERNED WITH QUALITY HEATING OF METALS

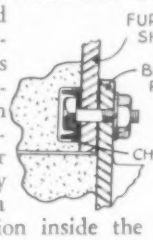
Furnaces Designed for the Men Who Run Them . . . as well as for the Product and the Treatment

Any *good* furnace handles the work surely, holds its temperature on the nose, and keeps up with production rates. But a *fine* furnace does more. A *fine* furnace takes into account the man who runs it. R-S has made *fine* furnaces for 38 years.

Take the matter of workmen's toes smashed beneath improperly guarded door-counterweights—or the matter of counterweight guards which become wastebaskets for lunch-pail refuse. R-S intentionally plans every guard sufficiently high and close-fitting to discourage its use as a receptacle—but never tries to save a foolish penny by omitting it.



Then there's the business of mounting burner plates. Heads of bolts which lie between furnace shells and refractory linings will work loose and spin under the wrench, unless restrained. On the other hand, welded studs make replacement hard if threads are stripped or damaged. R-S has been using a simple ingenuity to answer the enigma for many years. It welds a short channel section inside the shell, just large enough to accommodate the bolt head across its flats. The bolt is free, but it can't turn.



Now let's suppose you're a car-hearth or kiln-type furnace user. That means a sand seal—made by the average furnace builder of unyielding angle-iron or cast webs. Think of what could happen when work-pieces or tools tumble into such a seal and jam it! R-S outguesses trouble by making the male web of any sand seal thin enough (16 gauge) to "give" in an emergency—to allow cars to be drawn without furnace shut-down.

And finally, what about those leaks through peep holes, which keep furnace men busy shaving brick plugs and burning their fingers? R-S thoughtfulness of detail calls for free-acting covers which fall shut by gravity, and have openings you can engage with anything from a lead pencil up.

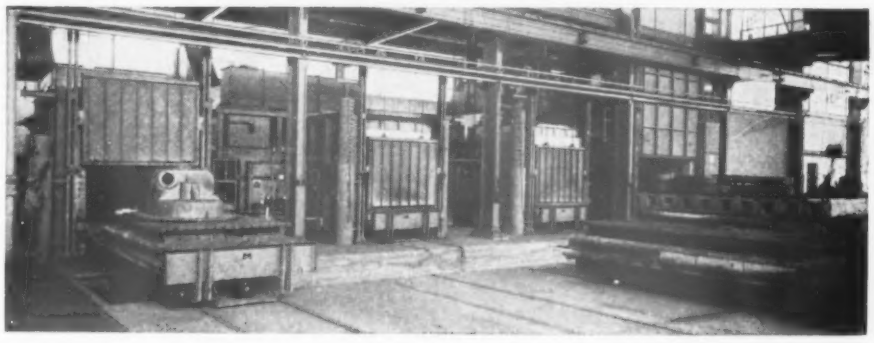
Think of the men who run your furnaces the next time you plan a new one.

LAMENT IN LIMERICK

There was a heat treater from Wheeling
Who had a peculiar feeling.
He broke a prime rule,
Shut off air before fuel,
And his furnace went up through the ceiling.

P.S. Had it been an R-S furnace (always equipped with safety shut-off valves) the last line would read differently.

Furnace Family — for a Foundry



This battery of four R-S furnaces at General Metals Co. (Oakland, California) is an excellent example of convenience and flexibility in heat treating steel castings. One furnace (right) is extra-big—for the huge work and the larger charges. It goes to 2000°F. One furnace (second from left) is of the convection type, for all operations from 600 to 1250°F. Its external heater may be seen behind the column at the left of the furnace. The other two units are direct fired for work from 1200 up to 2000°F.

Note also the transfer car pit, the craneway planning, and the direct motor drive on the transfer car, the furnace cars and the large furnace door. Firing in all cases is with combination oil and gas burners, to take advantage of seasonal gas rates and favorable and unfavorable oil supply situations.

Here is a heat treat department wisely designed for adaptability to the fortunes and fluctuations of the business it serves.

J. H. Sipchen Heads New R-S Sales Group in Chicago

Welcomed this summer to the field sales and engineering family of the R-S Furnace Division was J. H. Sipchen Co., who will service forging, foundry, steel-mill and heat-treating users of furnaces in Illinois, Wisconsin, Lake County (Indiana), and the Tri-cities. With Sipchen, at 549 N. Washington Boulevard, Chicago 6 (phone—Randolph 0709), will be Paul Miller, erstwhile of the W.P.B.

Known for 20 years throughout mid-west heavy industry, Sipchen's more recent affiliations have been V.P. and Gen'l. Mgr. of Hannifin Manufacturing Co., Asst. to Pres. of Anker-Holth, and V.P. of Manufacturer's Equipment Co. Possibly his best known current work is in behalf of Erie Foundry Co., steam and board drop hammers, trimming presses and hydraulic presses.

JMLcoP-L1

VIBRATIONLESS

. . . no matter where

SCHRAMM AIR COMPRESSORS

are installed in your plant!

No vibration . . . but all the air you want! Schramm Air Compressors are easily installed, require a minimum of space, and are compact: yet NO VIBRATION!

Schramm Air Compressors are specified by industry today because they furnish all the air you want, whenever and wherever you want it. Each unit is tested before it leaves the factory, and goes to work as soon as it is installed.

Both stationary and portable units are available, in every size mounting and assembly. A new Booklet giving full construction details and advantages you get with Schramms is yours for the asking. Write us today for your copy.

SCHRAMM INC.

THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

(*Concluded from page* 194)

When the molds are small enough to be lifted they are placed on the conveyor line described previously. With larger molds the work is performed on the floor, and the drying of the mold wash is accomplished with torches.

Wear and heat resistant castings are given a differential heat treatment in oil-fired furnaces. The castings are heated to around 1650 F and then cooled in an air blast to around 1000 F. They are soaked at that temperature for several hours and air cooled to handling temperature.

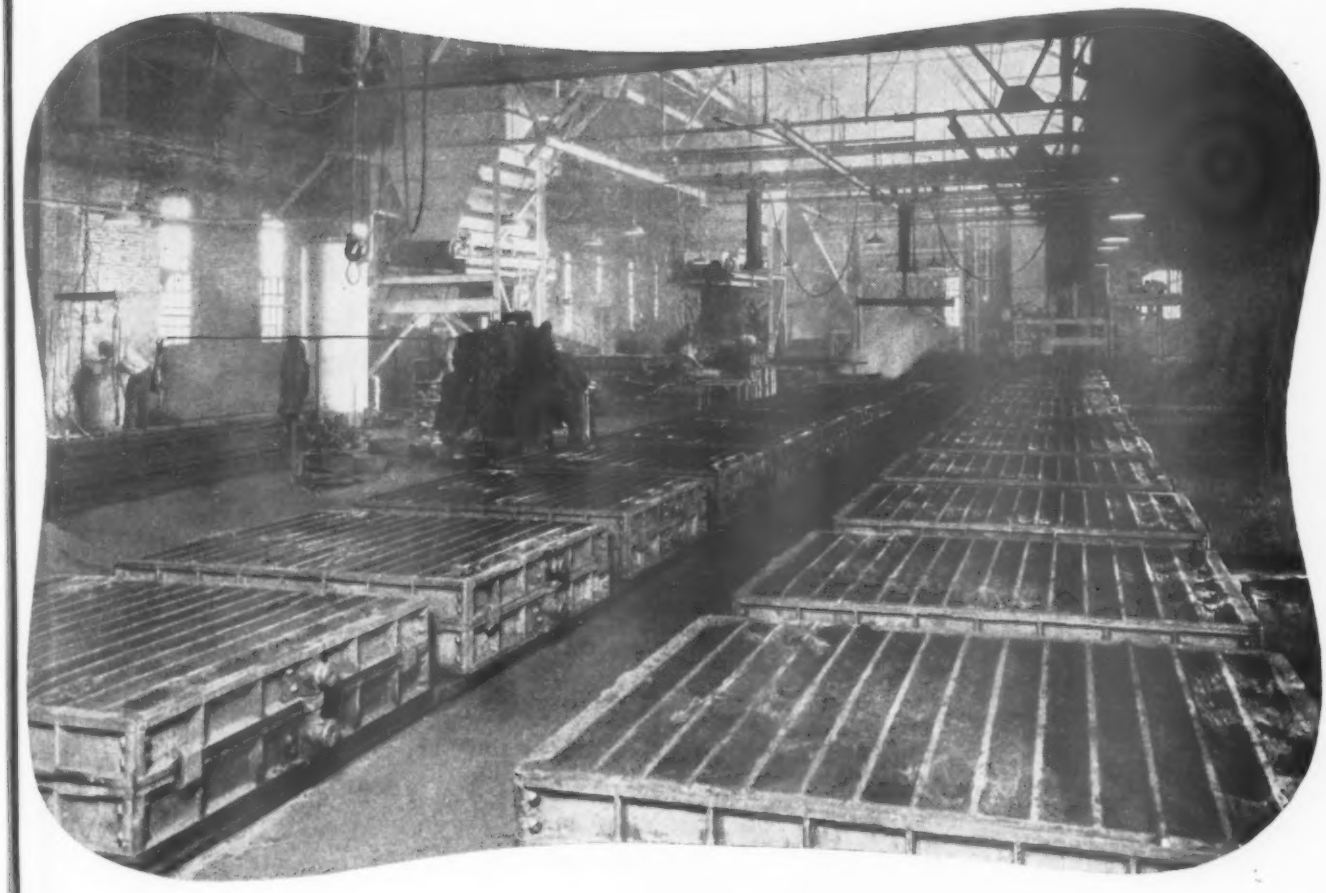
Mathews Expanding On West Coast

Mathews Conveyer Co., Ellwood City, Pa., instituted a new sales policy for its subsidiary, the Mathews Conveyer Co. West Coast, effective Oct. 31. The working agreement which Mathews had with Mailler Searles Inc. terminated on that date and all sales of Mathews conveyers

P. W. BROWN

in the Pacific states and Hawaiian Islands are now handled by the subsidiary's sales organization.

Sales engineering offices, manned by experienced conveyor engineers, will be maintained in Los Angeles, Portland and Seattle; the Bay area will be served from the sales engineering office at San Carlos, Calif. P. W. Brown, of San Francisco, who is familiar with conveyer problems of West coast manufacturers, heads the sales organization. Mathews' manufacturing division will remain at 300 Seventh St., San Francisco, until approximately Jan. 1, at which time a new factory building now under construction in San Carlos will be occupied. Company manufactures gravity and power conveyers for both light and heavy industry.



Ounces or Many Pounds . . .

Whether your castings are large or small, ferrous or nonferrous, Bartlett-Snow equipment will increase both the quality and quantity of your output. Individually engineered to your own particular requirements, Bartlett-Snow sand, mold and casting handling equipment turns the theoretical advantages of the newer, more fully accepted mechanized foundry practice, into practical dollar and cents advantages. Costs go down. Your product finds readier sale. The workmen get larger take home pay—easier—like their jobs better, reducing absenteeism and turnover. And the smoother, more even, more continuous production means bigger profits, larger dividends for you. Can we send you more details?

Bulletin No. 91 sent on request

THE C. O. BARTLETT & SNOW CO.

6201 HARVARD AVENUE • CLEVELAND 5, OHIO

ENGINEERING REPRESENTATIVES IN THE PRINCIPAL CITIES

FOUNDRY SAND, MOLD AND CASTINGS HANDLING

Make This **DUST HOG**

Pay His Own Board

The majority of users of Pangborn dust control equipment say their systems practically pay for themselves due to reclamation of dust by-products.

Even if your plant's dust is worthless, it pays to keep DUST HOG from devouring profits—interfering with worker efficiency, helping wear out equipment, soiling finished goods, causing accidents.

A free booklet, "Control of Industrial Dust," tells how to eliminate costly "dust pockets". Write PANGBORN, 300 Pangborn Boulevard, Hagerstown, Maryland—*world's largest manufacturer of dust control and blast cleaning equipment.*

Pangborn

PANGBORN CORPORATION, HAGERSTOWN, MARYLAND

OBITUARY

Nelson Westover, 93, retired foundryman of Lincoln, Nebr., died there Sept. 18. Mr. Westover, father of C. E. Westover and grandfather of Jeff A. Westover, Westover Engineers, Milwaukee, was a pioneer in the foundry industry in Nebraska, where he operated a blacksmith shop which later became a foundry for the production of structural castings.

• • •

Murray Kice Jr., 53, chief engineer, American Blower Corp., Detroit, died Sept. 25, in that city, following an illness of two years. A native of Louisville, Mr. Kice was graduated from Purdue University and joined American Blower Corp. as a mechanic in the fan shop.

• • •

Robert A. Kiefer, 82, associated with Gardner-Denver Co., Quincy, Ill., for 45 years, died Sept. 15, at his home in that city. Mr. Kiefer was an expert in scientific work with machinery and tools and was eastern sales representative for Gardner-Denver Co. for 9 years, in New York. He retired from business in 1926.

• • •

John A. Sizer Sr., 66, vice president and general sales manager, Industrial Gear Mfg. Co., Chicago, died Sept. 17 in Seattle. He had been associated with the foundry and gear business in Chicago 45 years.

• • •

D. T. Williams, 91, retired founder, D. T. Williams Valve Co., Cincinnati, died there recently. Mr. Williams organized the company in 1904. Prior to that he was vice president and general manager, Lunkenheimer Co., Cincinnati.

• • •

Jean Henri Griffoul, 59, founder of the Jean Griffoul Foundry, Newark, N. J., died Sept. 7 at his home in that city, after a long illness. Born in Paris, Mr. Griffoul went to Newark in 1902.

• • •

John E. Robinson, 67, who retired in 1945 as supervisor of metallurgy, International Harvester Co., Chicago, died Sept. 26 in that city. He had been associated with the company 20 years.

• • •

Brownrigg L. Norton, 45, assistant vice president and eastern representative, Scullin Steel Co., St. Louis, died Sept. 14 in New Rochelle, N. Y.

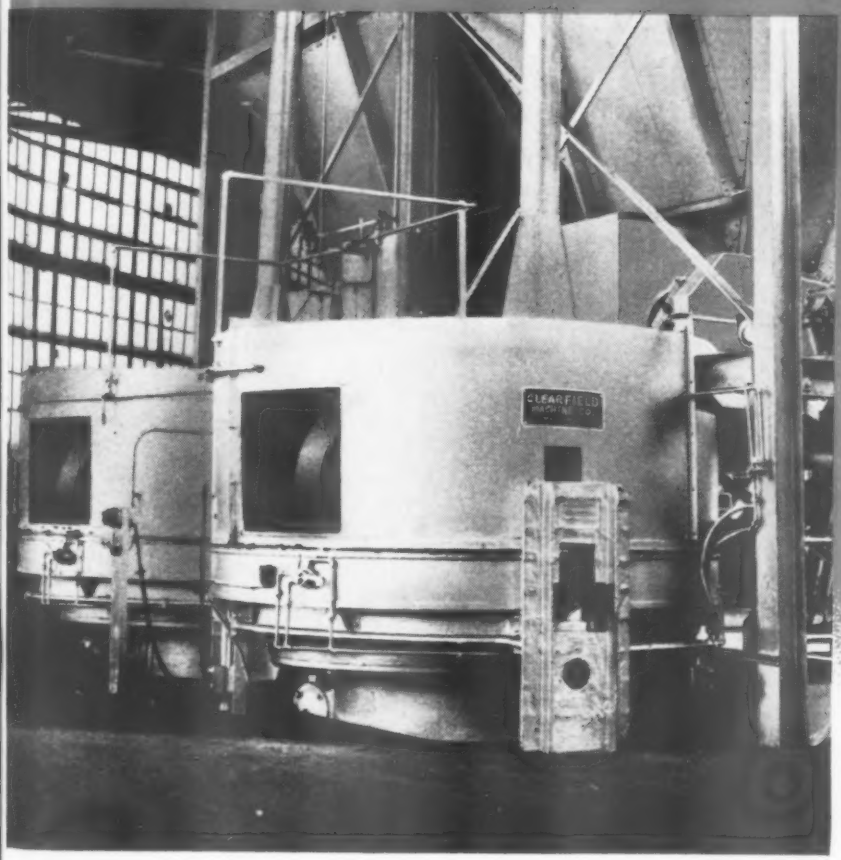
• • •

Stanley Adamski, 44, foreman, Maynard Electric Steel Castings Co., Milwaukee, died Sept. 16 in that city.

• • •

Harold A. Prest, 48, president, Prest Pattern Works, Chicago, died Sept. 13 in that city.

THE *Ideal Mixer*
IN SAND HANDLING SYSTEMS



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An extensive re-equipment program centered around this Clearfield installation.

- CONVENIENT TO INSTALL
- EASY TO CONTROL
- SHORT MIXING CYCLE
- LITTLE WEAR AND MAINTENANCE

The Clearfield story is in our catalog. Write for yours today.

CLEARFIELD MIXER
FAST, THOROUGH SAND PROCESSING

CLEARFIELD MACHINE COMPANY
CLEARFIELD PENNSYLVANIA, U. S. A.

CALL LEAVENWORTH 294

for an IMMEDIATE ANSWER to your RIDDLE NEEDS

* Take nothing for granted on delivery dates for that COMBS Great Western Gyratory you need . . . call us and we will give you a quick, dependable answer.

TYPE V, illustrated above, is priced at $210.00 complete, and is one of several available types.

COMBS Gyratory Foundry Riddles and equipment are distributed by Foundry Supply Houses throughout the United States and Canada . . . ask your supply house for details on our wide range of sizes.

Great Western
Manufacturing Company
LEAVENWORTH, KANSAS

MOTION PICTURES TO TEACH FOUNDRY WORK

(Continued from page 87)

ture. The darkened room cuts out other impressions and the lighted screen focuses attention upon what is being portrayed. To a large extent, each person seeing a film identifies himself with the operator. When he rolls a drag, the viewer follows his motions and performs subconsciously the same motions. He learns by imitating—and he'd better imitate actual movements, not movements in reverse.

Another characteristic of the Office of Education training films is that they are in series, progressive in difficulty and the entire series planned as a visual course of study. While each film can stand alone, they are built upon one another and progress from one to the next. For example, the terms "drag" and "cope" are defined visually and verbally in the first Bench Molding film, but not in the other four films in the series. Rolling a drag is demonstrated carefully and even in slow motion in the picture "Molding with a Loose Pattern," but in succeeding films it is shown only as part of other more advanced operations.

Instead of five separate films on Bench Molding, the five Office of Education films are really sections of one long 90-minute picture—like the chapters in a textbook. The advantages to training directors and vocational teachers of such series of films are obvious. Integrated in a series, the individual films can be correlated with special parts of a training course.

Not only will these films be useful in training beginners and apprentices, but they can also be used as "refreshers" for experienced foundrymen to show them new methods and new techniques, to familiarize them with new machines and new processes. Testimonials from plant foremen indicate that men with 20 to 30 years experience often profit from seeing the films: "I never knew before why I did it that way" or "Say, that's a good idea. Guess I'll try it."

Another characteristic of the Office of Education foundry training films is their technical accuracy. Every step in production—from the script to the finished picture—was supervised by a technical expert and a visual specialist of the Office of Education. In addition, each film was checked and double-checked by an advisory committee of vocational and technical experts in the community where the films were made. This committee read and

(Continued on page 202)

"They're darn good... for 3 REASONS"

On being asked for his reaction to Tabor Column Jar-Squeezers, the superintendent of a large eastern foundry said: "They're darn good, and for 3 reasons."

"Equipped with those Tabor automatic blow-off valves, they deliver a *uniform* squeeze. We work in a wide range of pressures, so squeeze accuracy is doubly important. For us, the Tabor's precision mechanism leaves nothing to chance. Result? Better molds . . . and better castings."

He emphasized his second point! "They are easy to operate . . . speedy. The ball bearing head quickly swings in and out of squeezing position. Riddle-rack, molder's bench, valves, pressure gauge and dusting valve are designed and located to save operation time. So, we're getting not only better castings, but more of them."

"Finally, our Tabor Squeezers really 'take it'. I was told they were rugged, *and they are.* We simply take low maintenance cost and long service life for granted."

Tabor has been designing and building foundry molding machines for over 60 years. The returns *you* can expect from Tabor equipment stem from this long experience. Whatever your foundry machine requirements, call on us.

REPRESENTATIVES

Snyder Foundry Supply Company, Los Angeles, California; Gallagher Foundry Supply Company, San Francisco & Oakland, California; Carl F. Miller & Company, Seattle, Washington; M. W. Warren Coke Company, 1017 Olive St., St. Louis 1, Mo.

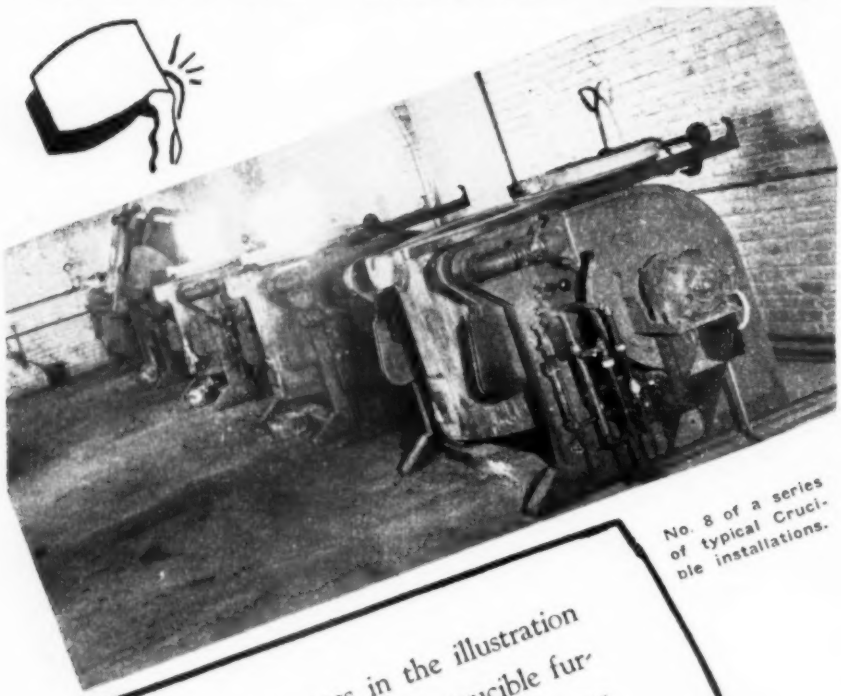
MANUFACTURERS' ASSOCIATION INC. FOUNDRY EQUIPMENT

The TABOR Manufacturing Co.

SINCE 1884 MANUFACTURERS OF FOUNDRY MOLDING MACHINES

6225 TACONY STREET · PHILADELPHIA 35, PENNA.

A MODERN CRUCIBLE FURNACE INSTALLATION



No. 8 of a series of typical Crucible installations.

The furnaces in the illustration are oil fired. Similar crucible furnaces can be operated with gas or coke fuel. When using such furnaces, the fuel cost stops when the operator turns off the supply. There are no "stand-by charges" when the furnaces are idle.

For lowest investment, operating economy, flexibility and sound castings install Crucible furnaces. Write for Crucible Melters' Handbook; mailed free.

Five hydraulically tilted, nose-pour brass melting furnaces using No. 400 crucibles. Photograph taken in plant of Republic Brass Co., Cleveland, Ohio. Capacity 24,000 to 30,000 lbs. red brass per eight hour day. Requires only three men to operate furnaces.

CRUCIBLE MANUFACTURERS ASSOCIATION

90 WEST STREET, NEW YORK 6, NEW YORK

(*Continued from page* 200)

approved the script before camera "shooting" started, viewed the photographic "rushes," and checked the commentary before the picture and the sound track were put together. They made changes, suggested improvements, caught errors and corrected them.

This vocational advisory committee on the Bench Molding series consisted of John J. Duggan, supervisor of vocational work, Chicago Public Schools; Harold Ferguson, Jr., plant superintendent, Acme Aluminum Foundry Co., Chicago; A. S. Klopf, Lester B. Knight & Associates, Chicago; Chester V. Nass, vice president, Pettibone Mulliken Corp., Chicago; and Roy W. Schroeder, instructor in foundry practice, Washburne Trade School, Chicago.

For the Floor Molding series, the committee consisted of Mr. Duggan, Mr. Schroeder and three others: William Cureton, foundry superintendent, W. A. Jones Foundry & Machine Co., Chicago; Albert DiGirolamo, general foreman, Chicago Steel Foundry Co.; and Clayton F. Wells, president, Chicago Foundry Co.

Checked by Experts

The two films on Machine Molding, which were produced in the New York area, were checked by W. A. McGrath, general superintendent, Worthington Pump & Machinery Corp., Harrison, N. J.; Clarence H. Cline, plant manager, Cooper Alloy Foundry Co., Hillside, N. J.; Edward Doe, foundry instructor, Brooklyn Technical High School, Brooklyn, N. Y.; and George Adams, sales engineer, Osborn Mfg. Co., Cleveland.

On the final two films, dealing with the operation of a cupola, which were also photographed in New York, the advisory committee consisted of S. L. Anderson, sales engineer, Whiting Corp., New York; Mr. McGrath; H. B. Caldwell, district manager, Whiting Corp., New York; J. A. Bukowski, metallurgist, Worthington Pump & Machinery Corp., Harrison, N. J.; and E. J. Bothwell, sales engineer, International Nickel Co., New York.

To these men and to the U. S. Office of Education specialists who supervised the films—Edward Christiansen, Stanley McIntosh, Sidney Owen, and Harry Zaritsky—goes credit for their technical accuracy and authenticity.

A fourth unique characteristic of these foundry films is that each motion picture is accompanied by a 35-mm silent filmstrip which reviews important points shown in the motion picture, clarifies difficult operations, raises questions for

(*Continued on page* 204)

Inspection with MAGNAFLUX*

SPOTS DEFECTS . . . STOPS REJECTS

● With both foundry costs and competition steadily rising, sub-standard production becomes a double threat to successful operation . . . by increasing profit-eating scrap losses . . . by jeopardizing customer goodwill. Magnaflux provides effective and economical defense against both.

Speedily and accurately, Magnaflux strikes at the source of most rejections—shrinkage cracks, blow holes, porosity and other discontinuities—detects and exposes these surface and hidden faults in castings *before* they reach the buyer. And by permitting easy analyses of the causes of such defects, Magnaflux points the way to correction . . . to maximum yields of sound castings from future melts.

Now, more than ever before, you need the positive quality control assured by inspection with non-destructive Magnaflux . . . *Write for complete information today.*

MAGNAFLUX CORPORATION

** Magnaflux, Reg. U. S. Pat. Off., a trade mark of Magnaflux Corporation applied to its equipment and materials for magnetic particle inspection.*

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SUGGESTION FOR CUTTING COSTS

Now and in the Future!

Look Into Everything ROLLER CONVEYORS Can Do . . . Ask STANDARD CONVEYOR

The steps you take now—the investment in equipment that you may make to cut handling costs will not only pay dividends immediately but can be expected to yield equal or even greater returns in days to come, when handling and other unproductive costs will be under the closest scrutiny.

Roller conveyors are unequalled in low first cost, flexibility and minimum operating expense. They handle a wide range of commodities — molds, castings, parts, units, barrels, bundles, drums, boxes. They are available in light, average, or heavy-duty types for either portable or stationary use—in a wide variety of sizes, styles, and lengths. Roller conveyors are built in their entirety by Standard, including the vital bearings which are manufactured expressly for severe foundry service.

Besides roller, Standard builds belt, chain, slat, and push-bar conveyors, also spiral chutes, tiering and lifting machines, portable pilers, and pneumatic tube systems.

On any conveyor requirement Standard Conveyor is equipped by experience and facilities to recommend and furnish the right type of equipment.

Write for valuable reference book "Conveyors by Standard." Catalog No. F-116.

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General Offices: North St. Paul 9, Minn.
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Gravity and Power
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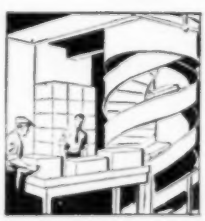
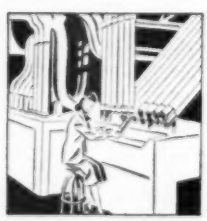




ROLLER · BELT · SLAT · PUSHBAR CONVEYORS • PORTABLE CONVEYORS AND PILERS • SPIRAL CHUTES • PNEUMATIC TUBE SYSTEMS

(*Continued from page* 202)

discussion and testing, and in some instances, gives additional information which could not be included in the motion picture. The Office of Education pioneered in this unique educational combination, and several educational film companies are now following a similar practice.

The filmstrip is both an aid to the teacher and a help to the student. It enables the instructor to hold a specific step or procedure on the screen indefinitely, to ask questions, make interpretations, and be reasonably sure that his students understand it. It enables the student to ask questions, to fix specific points in his mind, and to clarify their relationship to the total job.

For the most effective learning, some training specialists who have used the films recommend: 1. Show the motion picture. 2. Show the filmstrip; discuss the points raised in the filmstrip; ask and answer questions. 3. Show the motion picture a second time. Specific suggestions for using both the motion picture and the filmstrip are given in an instructor's manual which has been prepared for each of the film subjects.

Both the motion pictures and filmstrips can be purchased from more than 200 visual education dealers throughout the country or directly from Castle Films Inc., 30 Rockefeller Plaza, New York 20. Prices, which are set by government contract, vary with the length of the film. The filmstrips are all $1 and the instructor's manuals are furnished without charge to users of the films. The films can also be borrowed or rented from many educational film libraries. Here the rental charge depends upon the individual library.

Titles, descriptions, running times, and prices of the 14 films are as follows:

BENCH MOLDING

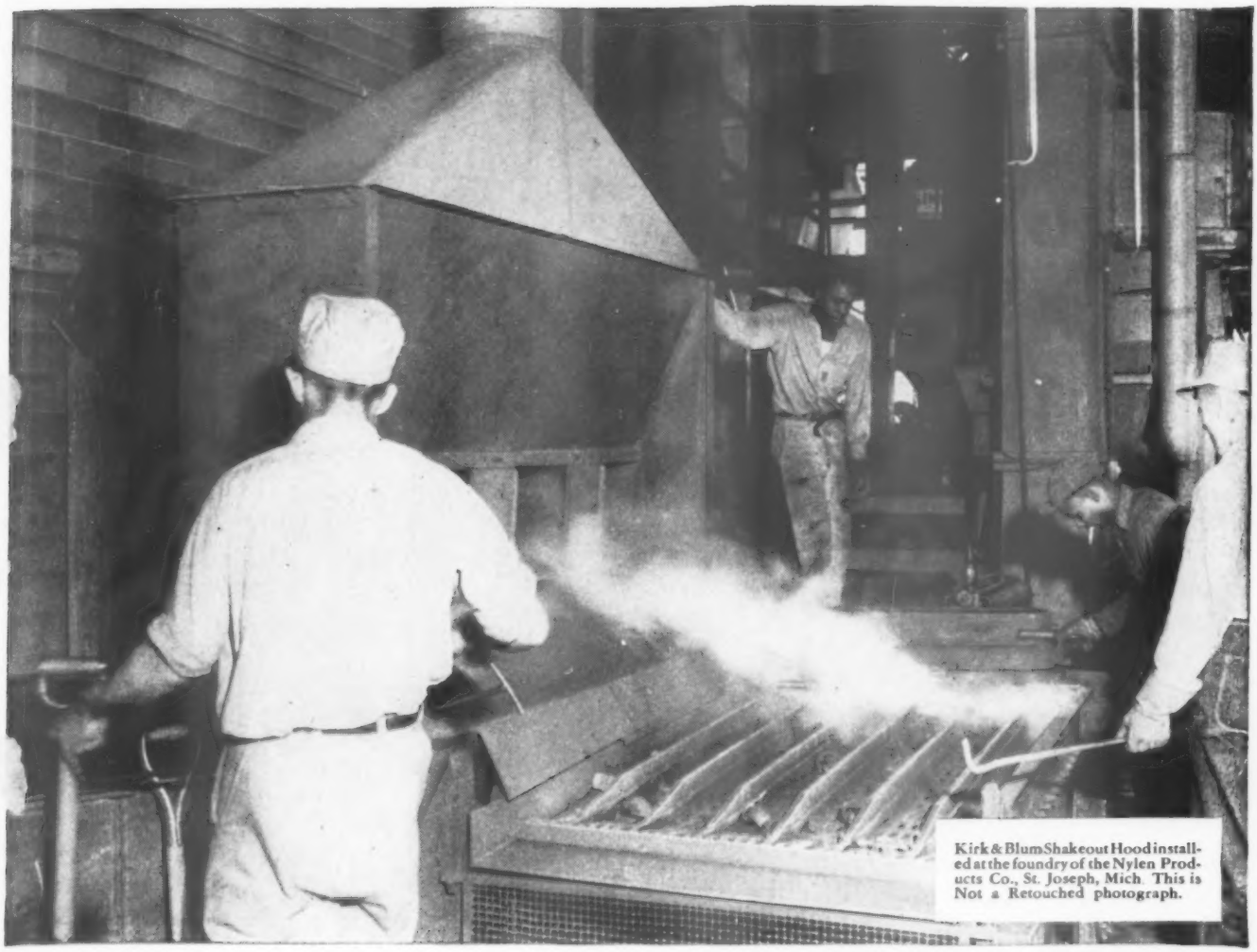
"Molding With a Loose Pattern"—Shows how to identify and use common bench molder's tools; how molding sand is prepared; how to face a pattern; how to ram and vent a mold; how to roll a drag; how to cut a sprue, runner, gates, and riser; how to swab, rap, and draw a pattern; and, by animation, what takes place inside a mold during pouring. (21 min., $28.38)

"Making a Simple Core"—Shows how to prepare a suitable sand for coremaking; how to make a small cylindrical core in either one or two pieces; how cores are baked; how to assemble a two-piece core; how to locate a vertical core in a mold and provide necessary venting; and how core gases escape when a mold is poured. (15 min., $22.58)

"Molding Part Having a Vertical Core"—Shows how to identify the parts of a pattern which indicate how cores are to be placed; how to mold the drag and cope halves; how to mold a gate and riser instead of cutting them; how and why a pouring basin is made; how to draw a pattern with a "molder's touch"; how to vent a mold so as to permit the escape of core gases; and how to locate a vertical core in a mold. (19 min., $27.10)

"Molding With a Split Pattern"—Shows why split patterns are used; how ramming affects the permeability of sand in a mold; how to mold

(*Concluded on page* 206)

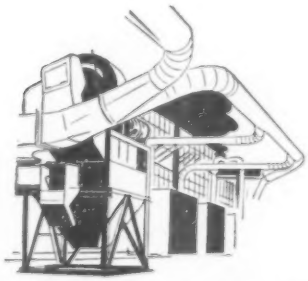


Kirk & Blum Shakeout Hood installed at the foundry of the Nylen Products Co., St. Joseph, Mich. This is Not a Retouched photograph.

KIRK & BLUM AIR ENGINEERING

. . . provides effective Ventilation of Shakeout

K & B Engineers determine the pipe sizes and correct location of the hood opening.



K & B Engineers select the right type of exhaust equipment to produce the desired airflow.

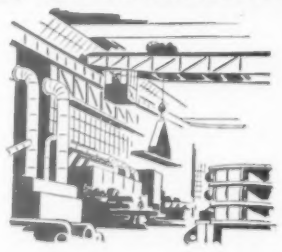
● Foundry men agree that of all dust sources, the shakeout is by far the worst and most troublesome. Without adequate control of dust and fumes at the shakeout, other forms of foundry ventilation are of little practical value.

Knowing these facts from extensive experience, Kirk & Blum have long specialized in the planning, designing, and installation of efficient and dependable systems for the control of shakeout dust and fumes. Like all K & B installations, these systems are *correctly engineered and custom-built* to fit the individual job—and guaranteed to provide *maximum efficiency at minimum operating cost.*

For complete details, including names of leading foundries utilizing our services, write us at the address below.

THE KIRK & BLUM MANUFACTURING CO., 2808 Spring Grove Ave., Cincinnati 25, Ohio.

KIRK AND BLUM



K & B Engineers design the equipment to provide for proper clearance, safety, and visibility of crane operators.

The actual installation, made under rigid engineering supervision, is carefully scheduled to assure minimum interference with foundry operations.

Willson Makes NEWS In PLASTIC EYE PROTECTION

NEW FeatherSpec

For Light Grinding, Wood Working, Spot Welding and Similar Jobs

Here's the solution to the problem of keeping safety spectacles on workers in semi-hazardous jobs—the new Willson FeatherSpec. So light in weight (less than an ounce) it can be worn all day long with complete comfort—even over regular glasses.

FeatherSpec furnishes 2-way eye safety—from impact hazards and from glare. The large one-piece lens provides wide angle vision as well as high frontal impact strength. The special "suspension-lock" frame holds the lens firmly in position, yet permits replacement in ten seconds!

Give your workers the benefit of FeatherSpec's new comfort and extra protective features. Available in two lens shades—clear or the new Willson Tru-Hue green, which keeps out glare without color distortion.

MORE PROTECTION WITH PLASTICS

WILLSON MONO-GOGGLE—Made of shatterproof plastic for over-all eye and nose safety. MonoGoggle wearers get extra comfort because of light weight, rolled contact edges, adjustable headband. Clear or Willson Tru-Hue green lens. May be worn over glasses.

WILLSON PROTECTO-SHIELD* Furnishes full-time safety for both front and sides of face. Lightweight, snug-fitting, comfortable. Tilted visor available in three lengths. Clear or Tru-Hue green plastic.

For help with your eye protection problems, consult your Willson distributor or write to Willson Products, Inc., 237 Washington St., Reading, Pa.

*T. M. Reg. U. S. Pat. Off.

GOGGLES • RESPIRATORS • GAS MASKS • HELMETS

DOUBLE WILLSON

PRODUCTS INCORPORATED

READING, PA., U. S. A. Established 1870

(*Concluded from page* 204)

the drag and cope; how to reinforce a mold with nails; and how to patch a mold. (19 min., $26.46)

"Molding With a Gated Pattern" — Shows what a gated pattern is and why it is used; how a match or follow board may simplify making a parting; how facing sand is prepared and used; and how and why some patterns are rapped through the cope. (11 min., $17.71)

FLOOR MOLDING

"Molding With a Loose Pattern"—Shows distinction between bench molding and floor molding; how to locate a pattern to facilitate making the parting; how to face a deep pattern; how to ram a drag and walk it off; how to clamp a mold; why crossbars are necessary in the cope; how to locate sprues and risers, using spotters; and how to tuck the crossbars of a large cope. (24 min., $32.08)

"Molding Part With Deep Green Sand Core"—Shows why to use a follow board with a thin, box-like pattern; how to reinforce a green sand core with nails; how to locate sprue and watch-up pins; how to use gaggers; and how to ram and vent a green sand core which must permit the escape of a considerable volume of gases. (25 min., $32.73)

"Molding a Valve Body"—Shows use of a split pattern and multi-part dry sand core; how nails are used to reinforce pockets and hanging bodies of sand; how to gate a mold for rapid, uniform distribution of clean metal; how to locate a core and seal the core prints; and purpose and use of a runner box. (26 min., $33.36)

"Molding a Horizontal Cored Part"—Shows use of a horizontal core; use of a split pattern; use of chaplets and chaplet supports; how to gate a mold for rapid pouring of thin casting; and how to clean a casting. (22 min., $29.67)

"Molding With a Three-part Flask"—Shows how to use a deep follow board; technique of facing, ramming, and venting a deep green sand core; how to use a cheek in a three-part flask; and the purpose and method of step-gating. (35 min., $42.74)

MACHINE MOLDING

"Molding On a Jolt Squeeze Machine" — Shows the principles of the jolt squeeze molding machine; the nature of the match plate; how to attach the air vibrator; how to fit the flask and match plate together; how to check the squeeze head clearance; how to fill the drag and jolt it; how to roll the mold; how to fill the cope and apply pressboard; how to squeeze the mold; and how to draw the pattern, finish, and close the mold. (10 min., $17.07)

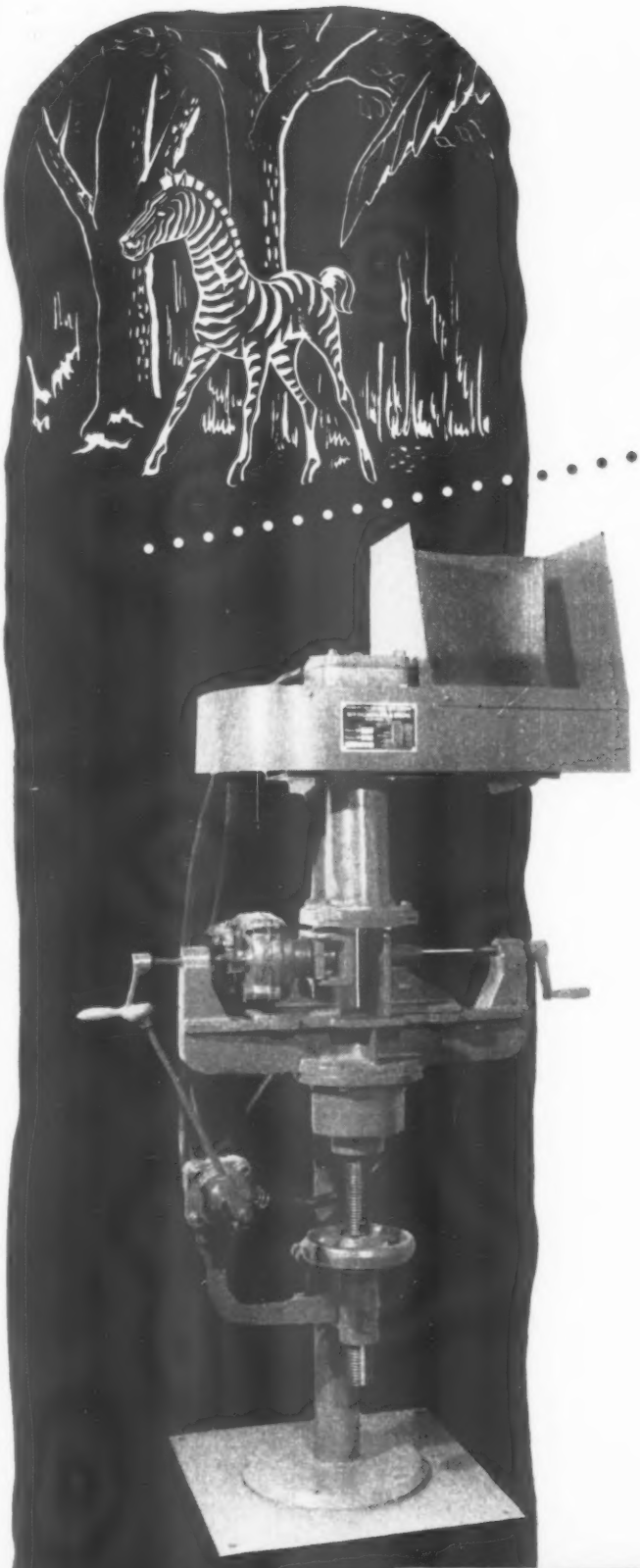
"Molding On a Jolt Roll-Over Pattern Draw Machine"—Shows the principles of the jolt roll-over pattern draw machine; how to place the flask on the roll-over table; how to fill the drag and jolt it; how to clamp the flask to the roll-over table; how to roll the mold over; how to draw the pattern; how to set the drag and cope pattern plates on master mold boards; and how to finish and close the mold. (23 min., $30.79)

"Preparing a Cupola For Charging"—Explains how to recognize the end of a heat; the procedures for dropping bottom; and the procedures for preparing a cupola for its next heat. (21 min., $28.38)

"Charging and Operating a Cupola"—Identifies and explains the purpose of the essential parts of the cupola; outlines the important steps and precautions to be followed in firing, charging, and operating a cupola; and explains the cycle of operations involved in the melting process. (14 min., $21.95)

Foundrymen Meet

Annual convention of Meehanite castings manufacturers, conducted under the auspices of Meehanite Metal Corp., New Rochelle, N. Y., is being held at Hotel Continental, Chicago, Oct. 31, Nov. 1 and 2. Representatives of the 40 Meehanite foundries in the United States and Canada are presenting some 50 researches conducted during the year on various foundry and casting problems.



ESPECIALLY ADAPTED

The zebra's stripes are perfect camouflage, making him especially adapted to the terrain in which he lives. The new DEMMLER No. 50 core blowing machine is especially adapted, too—especially adapted to short run jobs on small cores because of its quick, easy adjustments and simplicity of operation.

There is no small core blowing machine on the market today that offers so much for so little!

The DEMMLER No. 50 is a DEMMLER machine throughout—a machine you will be as proud of 10 years from now as today! It is equipped with both vertical and horizontal automatically operated air clamps. In fact, most of the important features of the large DEMMLER models are found on this reasonably priced machine.

The DEMMLER No. 50 is capable of blowing 200 cores an hour—every hour—and will easily handle cores weighing up to three pounds.

Height of the table is adjustable from 30 to 36 inches for the comfort of whoever operates it, and ANYONE can operate the DEMMLER No. 50! By means of a single hand valve, the core box is clamped and the core blown in but three seconds. No installation is necessary. Connect to an air hose and the machine is ready to use.

Here, at last, is the solution to the rapid and profitable production of small, high quality cores—the DEMMLER No. 50!

THE NEW DEMMLER NO. 50

Wm. DEMMLER & Bros
Kewanee, Illinois

MANUFACTURERS OF CORE BLOWING EQUIPMENT EXCLUSIVELY SINCE 1911

The adventures of BILL

By PAT DWYER

Drawings by RICHEY

Unfortunately," Bill said the other night, "I never was near enough to one of the great captains of industry, sometimes referred to as financial giants, to learn how they make money stick to their fingers, or, what is more important, how they juggle the stuff so that it increases and multiplies in a manner that must leave the rabbit family green with envy. I read about 'em now and again, but the stories do not add up properly."

"More likely you can't add up properly. Many charges have been hurled at men who have accumulated large sums of money, but most certainly the charge that they cannot add up 2 and 2 to make 5, is not on the list. They may not be strong on division, but when it comes to either adding or multiplying, they can carry on with their hands behind their backs. I knew an old fellow one time who started with nothing, even as you and I, and instead of ending with nothing, even as you and I, he collected several million dollars before the undertaker got the hooks into him."

"That starting with nothing stuff is what gets me. Some time ago I read a brief sketch of one of the greatest mazuma collectors in history. He started his career as general utility boy and junior clerk in a small estblishment conducted by his uncle. For the faithful performance of his duties he was paid the handsome honorarium of $4 per week. Instead of going out on a wild binge every Saturday night, or of hiring a horse and a rubber-tired wagon to take his girl for a ride on Sunday, he deposited the $4 in the bank. He did not spend a cent for clothing, food or shelter. The author skips the food and clothing items, but bears down heavily on the shelter. Our hero built a nest for himself out of old gunny sacks under the counter and slept there every night dreaming of barrels and boxes and nail kegs filled with shining gold coins, and bales and bales of the long green folded and pressed and neatly bound with a few strands of hay wire.

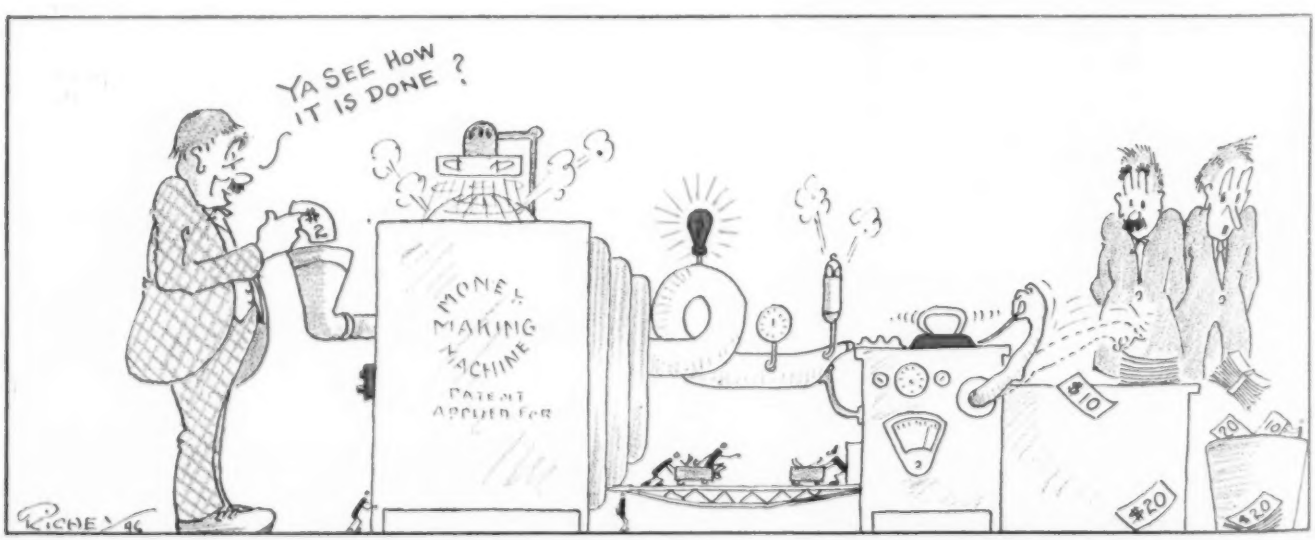
"I am willing to admit that a smart young fella can exist for a year without actually *buying* any food. Many methods are available, but I don't want to throw temptation in your way by submitting a list. I can remember Martin Skelly speaking very highly of the garbage cans outside the houses in certain sections of New Orleans, one time while he was stranded there waiting for a chance to hop a freight for Birmingham. However, all that is far away and long ago.

"We had another lad one time who made a regular round of all the dinner pails and cleaned them out in the afternoon. He pinched himself for food, but spent his money freely for pictures, statues and other objects of an ecclesiastical nature to hang on the walls of a cabin he had built in the woods. Exhibit No. 1 and a real work of art was a rosary, the full 15 decades, made from pine cones and draped over 10-penny nails in the wall near the head of his bed.

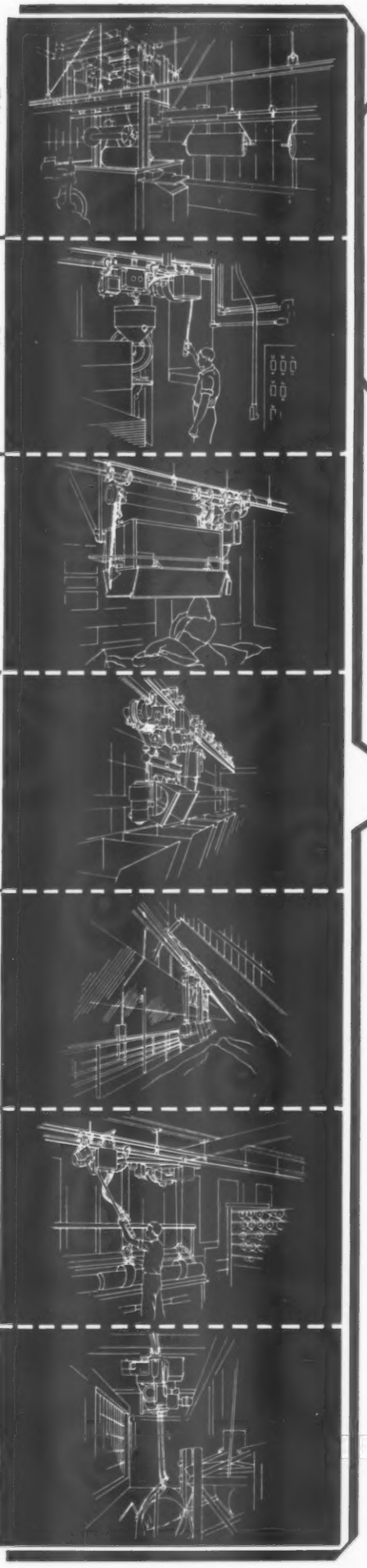
"The clothing item was not serious. Presumably the future big shot had a fair to middling suit when he started to work. With a pair of straw sleeve protectors the coat would last indefinitely. Concealed almost completely behind the counter, the knees and seat of the pants, worn shiny or actually worn through, attracted little or no attention. If that had been in an old time foundry, the ragged and patched clothing would have been accepted as a matter of course. No one noticed a rip or a tear before or behind, and shingle nails always were available when a button fell off. The air conditioned shirt and pants of the cupola tender had more holes than a beehive or a hunk of Swiss cheese as big as a grindstone."

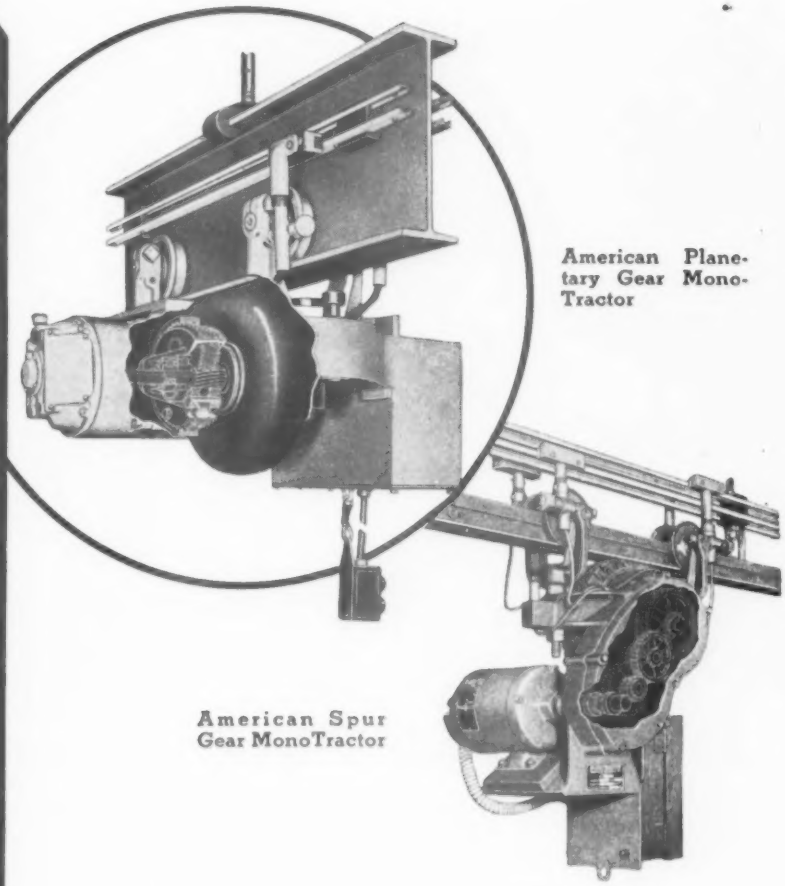
"You will pardon me for mentioning the fact," I said, "but you seem to have jumped the main line track some time ago and now are wandering among the high grass, the weeds, thistles and burdocks of an abandoned siding. If you can back her up we may come to the point where a certain rich man laid the foundation of his fortune by doing without food or clothing by sleeping under the counter and by depositing his entire $4 per week salary in the bank. Looks to me like a 100 to 1 shot that he comes out of the big end of the horn."

(*Continued on page 210*)



What doth it profit a man if the money won't buy a car, a house or a single pork chop?


Vertical transfer between floors.
Dispatch to multiple stations.
Delivery to fixed stations.
Delivery to multiple stations.
Delivery to movable stations.
Selective dispatch between multiple stations.
Loading and delivering to multiple stations.



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American Spur Gear MonoTractor

Automatic Carriers

For Overhead Handling

Through the application of simple electrical and mechanical devices, American Mono-Tractor Units perform automatic operations with extreme accuracy and reliability, saving costly handling labor and supervisory attention.

While unique in many features, such systems are built mainly from standard units. Mono-Tractors can be applied to carriers operating on any smooth bottom track. An American MonoRail Engineer is available for consultation in every important industrial area.

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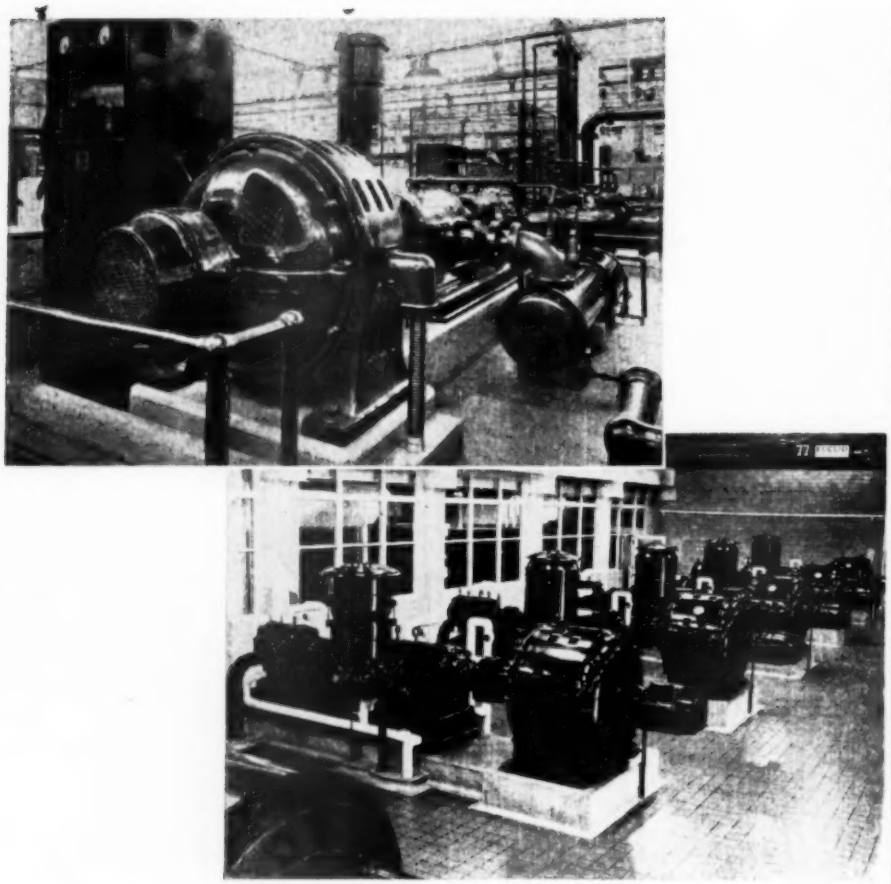

43 Fuller Rotaries Purchased Since 1939

Starting in 1939, one of the largest manufacturing companies of the country purchased its first Fuller Rotary Compressor. Satisfactory performance of the initial installation has led to many additional orders. Up to the present time, 43 Fuller Rotaries have been purchased and installed by the customer in its many plants throughout the country.

The majority of machines installed in these plants are of the two-stage type, operating at 125-lb. pressure, such as illustrated above.

These machines will serve for many years to come because, they're built for long, continous service . . . few working parts, none to adjust. In addition, due to design and construction, a Fuller Rotary maintains its original capacity for the life of the machine.

FULLER COMPANY
CATASAUQUA, PENNSYLVANIA

Chicago 3 - 120 So LaSalle St.
San Francisco 4 - 421 Chancery Bldg.
Washington 5, D. C - 618 Colorado Bldg.

FULLER COMPANY

FULLER-KINYON, FULLER-FLUXO AND THE AIRVEYOR CONVEYING SYSTEMS . . . ROTARY FEEDERS AND DISCHARGE GATES . . . ROTARY AIR COMPRESSORS AND VACUUM PUMPS . . . AIR-QUENCHING INCLINED-GRATE COOLERS . . . DRY-PULVERIZED-MATERIAL COOLER . . . AERATION UNITS . . . MATERIAL-LEVEL INDICATORS . . . MOTION SAFETY SWITCH . . . SLURRY VALVES . . . SAMPLERS

C-143

(*Continued from page 208*)

"And that is just where you usually wind up in picking winners. This is where you listen right sharp and see if you can find the answer. This lad according to the story, saved up $800 the first year. He invested this sum in the business and his progress after that was rapid and so forth, and so forth."

"Well," I said, "what's wrong with that?"

"He asks what's wrong with that! At the time all this happened the year was divided into 52 weeks, as at present. If you multiply 52 by 4 until you are black in the face and your fingers are numb from handling the pencil, the best you can get is $208, plus the trifling interest allowed by any bank in the country. There, my fine mathematical friend, is the sprag in the wheel, the fly in the ointment, the crack in the lute and—er-all that kind of stuff."

"The crack is there, but it is not in the lute. Without betraying any secrets, the author skilfully welds or splices this item into the story, and subtly flatters the reader by assuming that he will get the full significance. The hero of the story, by living like a bird on the bounty of the Creator, or by drawing sustenance out of the air like a plant, by refusing to buy clothes or pay rent, puts his $4 in the bank every week. At the end of the year his well thumbed little book, shows that he is the owner of $800. Could you do it? Could Westbrook Pegler do it? Could Gen. McArthur do it? Could Pres. Truman do it? The answer in every case is a loud and ringing NO. The art of stretching money, in this instance to four times its ordinary dimensions is a kind of fairy gift bestowed at birth on a comparatively small number of people.

"Individuals, special groups and occasionally nations fatten up the bank account by borrowing small or large sums with no intention of ever returning them. Burglars, pickpockets footpads, highwaymen and miscellaneous members of a brotherhood without morals, manners or conscience boldly exact tribute at the point of a gun or the threat of a blackjack. In recent years the simple, easy going, patient public has begun to show marked annoyance and disapproval over the vast sums siphoned into the hands of racketeers posing as friends of the laboring man. Sophisticated, enterprising and plausible gentlemen sell strangers gold bricks, packages of bank notes, the Brooklyn Bridge or choice lots inside the Chicago Loop."

"Well," said Bill, "I'll tell you. Since the fairies apparently and for no particular reason passed me by in bestowing the money stretching gift, and since I have not the heart to hold a citizen up

(*Continued on page 212*)

Books You'll Want

If you want to broaden your knowledge of the foundry industry the following informative and instructive books will prove most helpful. Select the ones you need at once—use the convenient order form below.

Gates and Risers for Castings *Price* $4.00
By Pat Dwyer. Sound foundry practice. How to prevent casting defects.

Modern Core Practices and Theories *Price,* $5.00
By Harry W. Dietert. A book devoted completely and in great detail to the production of cores. Will prove beneficial to every foundryman.

A.F.A. Symposium on Malleable Iron Melting *Price,* $3.00
Comprehensive, authoritative compilation. Just recently off the press.

Modern Blast Cleaning and Ventilation *Price,* $4.00
By C. A. Reams. Casting cleaning methods presented and discussed in detail. Also abrasive selection and use.

Tales from the Gangway *Price,* $1.00
A rollicking series of articles that contain practical solutions to everyday foundry problems. Written as only Pat Dwyer could do it.

Alloy Cast Irons *Price,* $3.25
Second edition. Thoroughly covers the subject in theory and actual foundry practices.

Just Published

HANDBOOK ON CUPOLA OPERATION

This 470-page text is the most complete ever assembled in one volume on the subject of cupola construction.

Every foundry operating a cupola will find this volume highly valuable.

Price $5.50

American Malleable Iron *Price,* $4.00
Complete data on present manufacturing practice and specifications of malleable cast iron.

Recommended Practices for the Sand Casting of Nonferrous Alloys *Price,* $3.00
A new book, just off the presses that will prove invaluable to nonferrous foundrymen.

Cast Metals Handbook *Price,* $6.00
A complete authoritative reference book dealing with all cast metals . . . steel, malleable, nonferrous and gray iron.

Impact Cleaning *Price,* $7.00
By Wm. A. Rosenberger. A compendium of impact cleaning information. Recommended methods.

Magnesium Alloys Foundry Practice *Price,* $3.00
A new book covering all phases and latest developments of magnesium casting.

Foundry Sand Testing Handbook *Price,* $3.50
The accepted standard reference book on methods of testing and grading foundry sands and clays.

A.F.A. SAFETY AND HYGIENE CODES

Code of Recommended Practices for Testing and Measuring Air Flow in Exhaust Systems ....Price, $1.00

Code of Recommended Practices for Grinding, Polishing and Buffing Equipment Sanitation ..Price, $ .60

Code of Recommended Good Safety Practices for the Protection of Foundry Workers .....Price, $2.50

Code of Recommended Practices for Industrial Housekeeping and Sanitation .....Price, $1.50

Recommended Good Practice Code and Handbook on Fundamentals of Design, Construction, Operation and Maintenance of Exhaust Systems .....Price, $4.00

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Please send (postpaid) the following books I have checked.

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- ☐ Handbook on Cupola Operation, $5.50.
- ☐ Gates and Risers for Castings, $4.00.
- ☐ Modern Core Practices and Theories, $5.00.
- ☐ A. F. A. Symposium on Malleable Iron Melting, $3.00.
- ☐ Modern Blast Cleaning and Ventilation, $4.00.
- ☐ Tales from the Gangway, $1.00.
- ☐ Alloy Cast Irons, $3.25.
- ☐ American Malleable Iron, $4.00.
- ☐ Recommended Practices for the Sand Casting of Nonferrous Alloys, $3.00.
- ☐ Cast Metals Handbook, $6.00.
- ☐ Impact Cleaning, $7.00.
- ☐ Magnesium Alloys Foundry Practice, $3.00.
- ☐ Foundry Sand Testing Handbook, $3.50.

A.F.A. SAFETY AND HYGIENE CODES:

- ☐ Testing and Measuring Air Flow in Exhaust System, $1.00.
- ☐ Grinding, Polishing and Buffing Equipment Sanitation, 60 cents.
- ☐ Design, Construction, Operation and Maintenance of Exhaust Systems, $4.00.
- ☐ Protection of Foundry Workers, $2.50.
- ☐ Industrial Housekeeping and Sanitation, $1.50.

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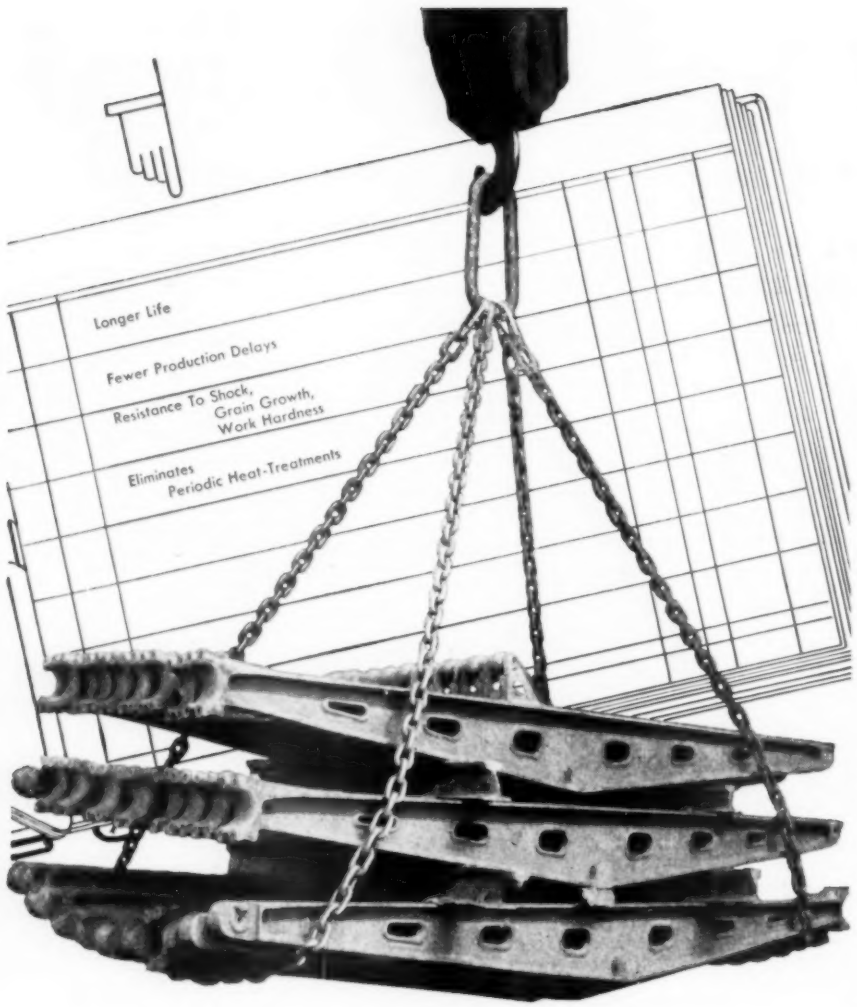
* Orders for delivery in Ohio must be accompanied by 3% additional to cover the compulsory state sales tax.



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HIDDEN PROFITS

in the chain you use?

Savings reflected from use of TAYLOR MADE Alloy chain are hidden profits. With twice the strength of ordinary chain you have fewer production delays. TAYLOR MADE'S longer life means less frequent replacement. Its terrific resistance to shock...grain growth and work hardness eliminates periodic heat-treatments—reduces operating and maintenance costs. Investigate TAYLOR today. Call your Mill supply distributor or write the factory direct.

S.G. TAYLOR CHAIN COMPANY
Dept. S-11, Box 509, Hammond, Indiana

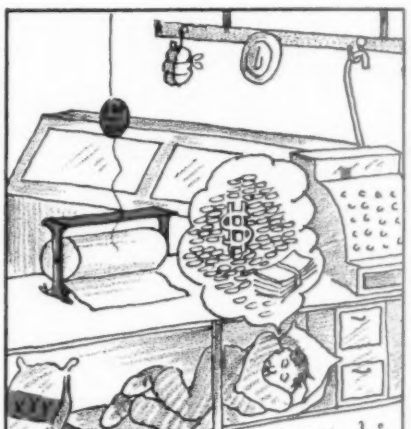
TAYLOR MADE *Chain*

"THE BEST BY TEST SINCE 1873."

(*Continued from page* 210)

at the point of a gun, and furthermore since I know nothing about selling gold bricks, packages of the long green, the Brooklyn Bridge or choice lots inside the Loop, I move you Mr. Chairman that we drop the whole thing and consider the troubles of a lady in Central America who wrote me recently as follows:

We have not been very successful in casting statuary, etc., by the lost wax process. Casting surface is rough. Mold material is a mixture of 2 parts powdered fire clay and 1 part plaster of paris. We shall appreciate information on: 1.—What properties and portions would you suggest to use in making bronze plaques, statuary and other ornamental bronze castings? 2—What is the proper temperature for pouring the metal? 3—What type of sand is employed in making molds? Where can it be bought,



Come where my love lies dreaming

and the price? 4—Is there any definite rule for the location and number of vents?

"That is quite a program to land in your lap in the middle of the afternoon. I prepared a short list of references and other items and then took the trusty old pen in hand with the following result":

A complete treatise on methods, materials and equipment employed in the production of statuary and other artistic and ornamental castings would form quite a large book. Up to the present, so far as we know, no author has attempted the work. Obviously, the demand for a book of that kind would be extremely limited. While it is true that a considerable number of men are qualified to discuss this highly specialized branch of the foundry business, it is equally true that writers hold as firmly as other men to the belief that the laborer is worthy of his hire.

It may be that eventually an altruistic individual, actuated by pure love, will write a book on the subject, but apparently, up to the present, no English speak-

(*Concluded on page* 214)

WOOD AND METAL PATTERNS BY HOWARD

"LIKE PEAS IN A POD" . . . Prompt service is now available on Howard's three spindle Keller machines for quickly reproducing many exact duplicate patterns from a master.

NO need to worry about patterns for that new casting job when Howard's complete wood and metal pattern shop facilities are as close as your telephone.

This call, followed with your print, will set the wheels in motion to deliver the finest patterns skilled craftsmanship can produce.

Plan today to put Howard's big pattern facilities to work for you. Whether your needs call for one or many, be assured that every job large or small gets the same careful attention that has gained for Howard a reputation for "Quality Patterns."

NEW TEMPLATE AND MODEL SHOP
This new shop, featuring the finest in woodworking machinery and skilled craftsmen, is equipped for, and producing models and templates for body building in the automotive industry.

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Chicago 39, Illinois

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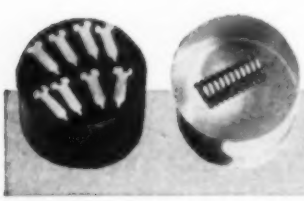
means precision in
METALLURGICAL TESTING EQUIPMENT

"Buehler equipment is made finer than might be considered absolutely necessary for laboratory work, but it certainly is a pleasure to use it." This remark made by a well known metallurgist is typical of the opinion throughout the field where Buehler testing equipment is used. If you use Buehler equipment you have the best.

STANDARD POLISHER NO. 1500

Accurately polished specimens can be produced with speed and ease with Buehler polishers. The sturdy construction and vibrationless operation help to prevent pitting and amorphous film. The 8" polishing disc is attached to a tapered arbor on the motor shaft by means of a stout sleeve. This construction feature reduces peripheral vibration to a minimum. The standard polisher is a complete unit with a direct mounted ¼ h.p. radial thrust ball bearing motor. 115V., 60 cycle, AC, single phase, with selective speeds 575 and 1150 r.p.m. controlled by a mounted switch with handy lever.

THE BUEHLER LINE OF SPECIMEN PREPARATION EQUIPMENT INCLUDES—
CUT-OFF MACHINES • SPECIMEN MOUNT PRESSES • POWER GRINDERS • EMERY PAPER GRINDERS • HAND GRINDERS • BELT SURFACERS • POLISHERS • POLISHING CLOTHS • POLISHING ABRASIVES



Buehler Ltd.
A PARTNERSHIP
METALLURGICAL APPARATUS
165 West Wacker Drive, Chicago 1, Illinois

(*Concluded from page 212*)

ing writer has been tempted. Possibly a foreign author, Italian, French or German, has written a book on the subject. Unfortunately, we are not in position to offer an opinion on this point. In an English translation of the autobiography of Benvenuto Cellini, a chapter is devoted to the production of the famous statue of Perseus. As with the remainder of the book, the chapter reveals the the swashbuckling characteristics of the author, but is singularly lacking in the practical, intimate details of the process. Considering the time devoted to his fights and his amours, the reader often wonders where he found time to do any work.

Although no author has written a complete book on the subject, many authors on many occasions have covered various phases of the process in the pages of THE FOUNDRY. If you had any opportunity of consulting a back file of THE FOUNDRY, we could give you a long list of references. These references deal with the production of individual statues, by the lost wax, and also by the sand process. They also cover the production of tablets, plaques and other ornamental castings in sand molds. In the past two years, THE FOUNDRY and other technical publications have presented numerous articles on the use of plaster in the production of so-called precision castings.

Taking your questions in the order of presentation the following brief comment may meet your present requirements:

1—A special plaster now is available in two forms. In one the plaster and asbestos are furnished separately and mixed by the user in proportion of 2 parts plaster and 1 part asbestos. The compound is mixed with water, 5 parts water to 4 parts powder: In a second form the plaster and asbestos are furnished in the ready mixed condition. Molds from this mixture are heated to a temperature of 1300 F., and then filled with bronze or other metal. Bronze plaques and similar castings are made in sand molds.

2—Many different alloys are known as statuary bronze. Some of these alloys are more brass than bronze on account of a large percentage of zinc. An alloy which seems to have the greatest claim to standard contains Cu 90 per cent, Sn 7 per cent and Zn 3 per cent. Where machining is necessary common practice favors the addition of 8 ounces of lead to each 100 pounds of metal.

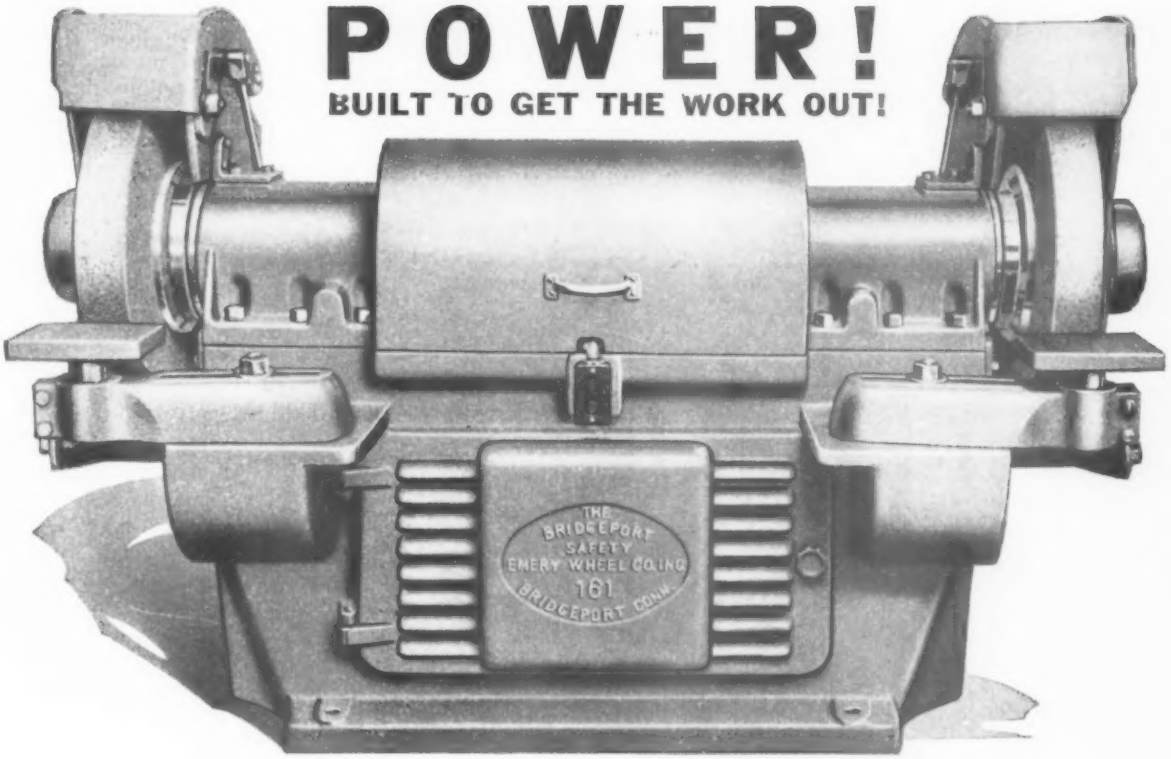
Pouring temperature of bronze is approximately 2000 F and of aluminum 1300 F. The temperature varies with the thickness or area of the casting

3—The highest grade sand for art work comes from a deposit near Paris. However, several deposits in the United States are quite satisfactory for tablets, plaques, etc.

4—There is no specific rule covering the number and location of vents. The general rule is to provide plenty. In this connection it is pertinent to point out that in addition to deliberately placed vent channels, the mold material must be permeable and, of course, perfectly dry. The lack of smoothness to which you refer probably is caused by a mold material lacking in permeability. Metal will not lie against a face of that kind. The commotion set up produces a rough, uneven surface on the casting.

POWER!

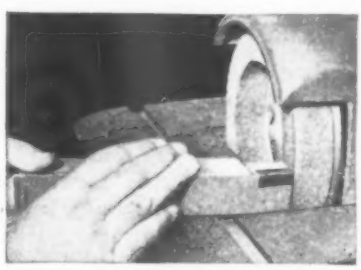
BUILT TO GET THE WORK OUT!



"Bridgeport" High Speed Grinder

No. 161, shown above, is a heavy duty grinder designed for maximum stock removal with high speed Resinoid Wheels up to 30" dia. x 4" face. Three speeds, with interlocking guard to insure proper speed of grinding wheel. Heavy welded boiler plate steel guards stand tremendous strain and afford ample protection for the operator and capacity for exhaust.

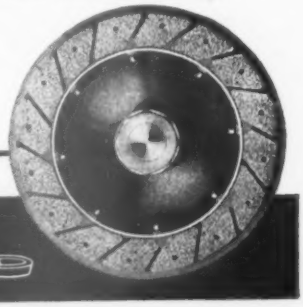
Two high carbon steel spindles of large diameter (one for each wheel) joined by a flexible coupling. Each spindle carried on two large, precision matched Timken bearings in independent housings. A speed control—which automatically warns the operator when the wheels reach a point where the speed should be increased—insures efficient operation, also prevents over-speeding. Large-hole wheels are used, and may be worn down to the flanges with safety. Powered with either 10 HP or 15 HP motor.



BUXITE The newest development in grinding wheels. Imparts to grinding wheels a "case hardening" that compares favorably with that of diamond wheels—but at a fraction of the cost. Buxite-processed wheels grind sintered carbide tools, both the tip and shank, and other superhard metals with a rapidity and economy never before attained in standard abrasives. As a result, the difficult grinding of cast alloy tools can now be handled in the average shop. In snagging, Buxite is also setting up outstanding records for speed and wheel economy.

THE BRIDGEPORT SAFETY EMERY WHEEL CO., INC., Bridgeport, Conn.

Bridgeport



GRINDERS • GRINDING WHEELS • BUFFING LATHES

Industry BRIEFS

UNITED Foundries Co., Detroit, has acquired the Detroit Suburban Grey Iron Foundry, 9615 Dixie Highway, Clarkston, Mich. and is operating it under the name of United Casting Co. Foundry is equipped with a 42-in. cupola, melting about 9 tons of iron per hour, and consists of 20,000 sq ft of floor space. D. Vincent is president of United Foundries.

• • •

Mechanical Foundries Co., Vernon, Calif., has announced its voluntary dissolution and the winding up of its affairs. Business and assets of the corporation will be taken over and its liabilities assumed by Food Machinery Corp., 333 West Julian St., San Jose, Calif., which will continue to operate the business as one of its divisions.

• • •

American Brake Shoe Co., New York, has under construction at Niles, O., a foundry and machine shop building, "L" shaped covering 35,000 sq ft, for the manufacture of railroad journal bearings. The plant will be operated by the National Bearing Division and will make a special product—bronze-back babbitt-lined car journal bearings for use on steam railroad cars and locomotive tenders.

• • •

F. G. Wade Inc., Cleveland, has been made exclusive agent throughout the United States for Baker Perkins Inc., Saginaw, Mich., makers of foundry equipment, and is planning to open sales offices in New York, Philadelphia, Pittsburgh, Buffalo, Birmingham, Chicago, Detroit, Denver and San Francisco. In connection with Perkins equipment, the company will offer a line of complete sand preparing units. It is also developing a line of automatic molding and automatic core making and setting machines intended for use on motor blocks and large run production castings.

• • •

C. H. Shurmer and Charles Terrell, Cleveland, have leased the Washington Bronze & Aluminum Co., Washington Court House, O., from John Boone. The plant will be known as the Washington Aluminum Castings Co. and will be newly equipped and expanded for the production of aluminum castings.

EXPANDS FOUNDRY DIVISION: Eastern Casting Corp., formerly located in New York, completed expanded facilities in its new aluminum permanent mold division at Newburgh, N. Y., at a cost of $250,000. Total capacity of the plant is 25,000 lb of finished permanent mold castings per day, with facilities for operating 35 molds at a time. In addition to the modernized foundry, a partial view of which is shown, complete heat treating and new laboratory facilities including x-ray, metallographic, analytical and physical testing laboratories have been installed. The plant has 85,000 sq ft of productive space

Beckett Bronze Co., 106 East Twentieth St., Muncie, Ind., has completed enlargement and modernization of its foundry, including the installation of electric furnaces. This foundry, operated by Charles Beckett, president, produces bronze bearings and other bronze and aluminum castings.

• • •

Foxboro Co. Ltd., Canada, is building a new plant in the Ville LaSalle section of Montreal. The plant will consolidate machining, metal finishing, assembly and calibration of instruments and other basic operations on one floor level. Foxboro Co. Ltd. is affiliated with the Foxboro Co., Foxboro, Mass.

• • •

Reedsburg Foundry Co., Reedsburg, Wis., has been incorporated by Bauer F. Bullinger, DeWayne P. Nehs and Albert B. Houghton with 1000 shares of capital stock at $100 per share.

• • •

Correct Castings Inc., Milwaukee, has been incorporated as a general foundry by Oren C. Alcorn, James N. Larson and R. N. Jost with capital stock of 200 shares at $25 per share.

• • •

Manucraft Inc., Milwaukee, has been incorporated as a general foundry with 100 shares no par value stock by George J. Klint, Elwin Evinrude and Reinhold Scharnick.

• • •

Lodi Foundry Co., Lodi, O., has been incorporated with $25,000 capital.

• • •

Schultz Die Casting Co., 1810 Clinton St., Toledo, O., has let contract for an 80 x 240-ft plant building estimated to cost $65,000.

• • •

Somerset Foundry & Machine Co., Somerset, Pa., plans a one-story foundry and machine shop costing over $50,000.

• • •

Gwin Brothers Pattern Works, 1916 North 13th St., Terre Haute, Ind., recently organized, is making all types of wood patterns.

• • •

Springer's Foundry Inc., 201 South First St., Terre Haute, Ind., has been completed. The president, Arthur R. Springer, formerly was associated with the McKee-Roesch Foundry Inc., Terre Haute.

• • •

The recently erected Union City Mold & Die Casting Co., Union City, Ind., will produce permanent molds and die castings.

• • •

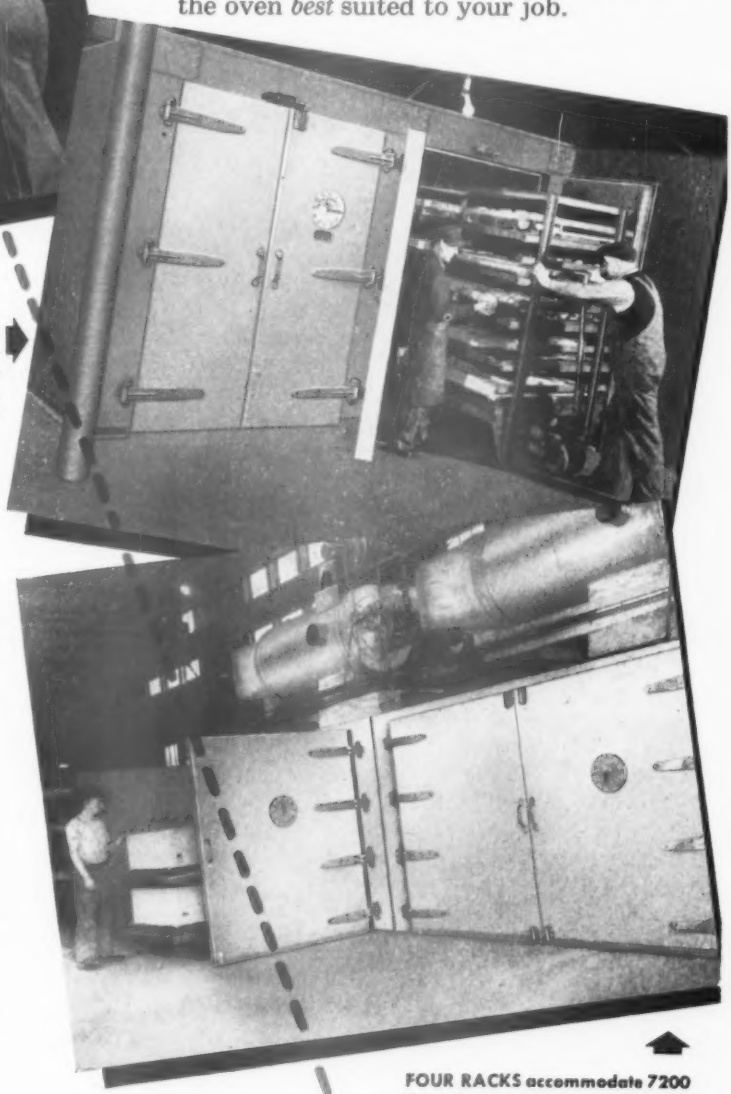
Davis Foundry Co., 403 North Ninth St., New Castle, Ind., has been purchased by G. L. Shank, president of Dill Inc.,

(*Continued on page 218*)

How DESPATCH helps Foundrymen get the *Right* BATCH TYPE CORE OVEN

ONE-RACK Despatch Oven at Prospect Foundry. It bakes 400% more cores than their old oven . . . and at 1/5 the fuel cost.

Here are several photos of Batch Type Ovens illustrating how DESPATCH engineers, after a careful analysis of your foundry's present and future needs, pick the oven *best* suited to your job.



TWO-RACK Despatch Oven installed at South Park Foundry. It bakes over 5 times more cores than oven used before, with 40% saving in baking costs.

With 44 years of specialized foundry experience, DESPATCH can select the oven which will give you maximum efficiency and performance. It will have these typical advantages:

BAKES FASTER . . . Your baking time can be speeded up as much as 50% for all sizes of cores with a DESPATCH "tailored-to-fit" Coremaster Baking Oven. DESPATCH Ovens have extra-fast heat recovery after loading.

ELIMINATES REJECTS . . . High-volume forced convection heat bakes cores thoroughly and uniformly throughout the oven, with *no baking rejects.*

LOWERS COSTS . . . Automatically-controlled recirculated heat and convenient rack-loading cuts fuel costs and saves labor. DESPATCH ovens meet the toughest schedules without downtime for maintenance.

CONSERVES FLOOR SPACE . . . Makes best possible use of your floor space and provides maximum baking capacity and handling convenience.

ADDS FLEXIBILITY . . . Assures speedy baking of large and small cores, has wide heat range. Patented-panel construction permits easy expansion of baking capacity for future needs.

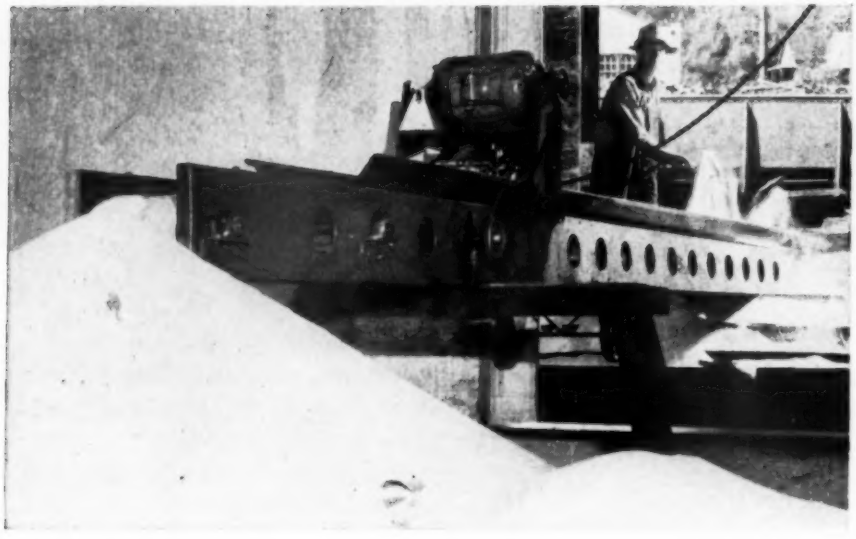
FOUR RACKS accommodate 7200 lbs. of cores per charge in each of the Despatch oil-fired ovens above. Typical large scale production units.

WRITE TODAY for Bulletin 31 on Batch Type Foundry Ovens

DESPATCH OVEN COMPANY

615 SOUTHEAST EIGHTH STREET • MINNEAPOLIS 14, MINN.

DESPATCH
OVEN COMPANY MINNEAPOLIS 14 CHICAGO 1



Tote-All the light conveyor that can take it!

Here's the fast, modern way to handle FOUNDRY SAND...

Shown above is the Tote-All Portable Conveyor being used to convey foundry sand from a box car into covered shed. Keeps two men busy shoveling sand into conveyor—steps up their efficiency by making the work easier for them. Tote-All conveyors save foundries time, money and equipment. (Actual tests show that a Tote-All Conveyor cut 14 hours time from hand-shoveling method during the unloading of a 75-ton car of core sand).

Tote-All Conveyors are built for the toughest kind of usage, but are lightweight and easy to handle. Power unit, either gasoline or electric, is mounted on top of conveyor—easily accessible, yet out of the way of dust, dirt and spillage. Available in 14 ft. and 20 ft. lengths. With the Trail-Hoist (combination trailer and lifting device), the Tote-All can be easily moved from one job to another and delivery end of conveyor raised to desired height with hydraulic lifting device. Get full details on the standard Tote-All for all round foundry use or the new lightweight Zephyr model which may be used for handling sand or annealing coal. Write for Bulletin F.

THE TOTE-ALL MAY BE USED FOR HANDLING PIG IRON . . .

Photo at left shows Tote-All Conveyor being used to unload a car of pig iron at a west coast foundry. Tote-Alls are used for many jobs at foundries—handles bulk material up to 14 in. top size. Tote-All Conveyors are a product of Material Movement Industries (Formerly Coaltoter Conveyor Co., Not Inc.) 310 S. Michigan Ave., Chicago 4, Ill.

WRITE FOR BULLETIN F

material movement industries

. . . for lowest cost material handling

(*Continued from page* 216)

Rushville, Ind. Mr. Shank will operate the Davis Foundry, casting gray iron exclusively.

• • •

McGill Mfg. Co. Inc., Valparaiso, Ind., was reported in the October issue of THE FOUNDRY to plan closing its castings division about Nov. 1, the foundry to be operated by new owners as a jobbing shop after that date. This report was in error, and the company is continuing its casting operations.

• • •

National Supply Co., 1524 Border Ave., Torrance, Calif., has obtained CPA approval for construction of a corrugated iron foundry building extension costing $45,000.

• • •

Stone Brass & Aluminum Foundry, 6811 Salt Lake Ave., South Gate, Calif., will build two aluminum foundry buildings at 11211 Garfield Ave., South Gate, to cost $36,000.

• • •

Basic Aluminum Castings Co., 8802 Harkness Rd., Cleveland, has been incorporated by Harold S. Beebe to manufacture and machine metal products.

• • •

Monarch Foundry Co., Plano, Ill., has been incorporated by Ellis M. Johns, Myrtle B. Johns and Howard C. Johns with 2000 shares of stock at $100 par value.

• • •

Engineering Castings Inc., 600 South Kalamazoo Ave., Marshall, Mich., was recently organized by David W. Boyd to manufacture castings and fabricated metal products.

• • •

Dayton Foundry & Stove Co., Dayton, Tenn., has been incorporated with A. C. Broyles as president and will construct a plant to manufacture gray iron castings for autos, farm implements and electric appliances, as well as stoves.

• • •

Superior - Lidgerwood - Mundy Corp., Superior, Wis., has been formed as a foundry and general machine shop by Charles Gray, Josephine Dailey and Oscar S. Johnson, with capital stock of 5000 shares at no par value.

• • •

Burndy Engineering Co. Inc., 107 Bruckner Blvd., New York, plans construction of a foundry, machine shop, assembly plant and office buildings at 138th St. and Walnut Ave., to cost approximately $500,000.

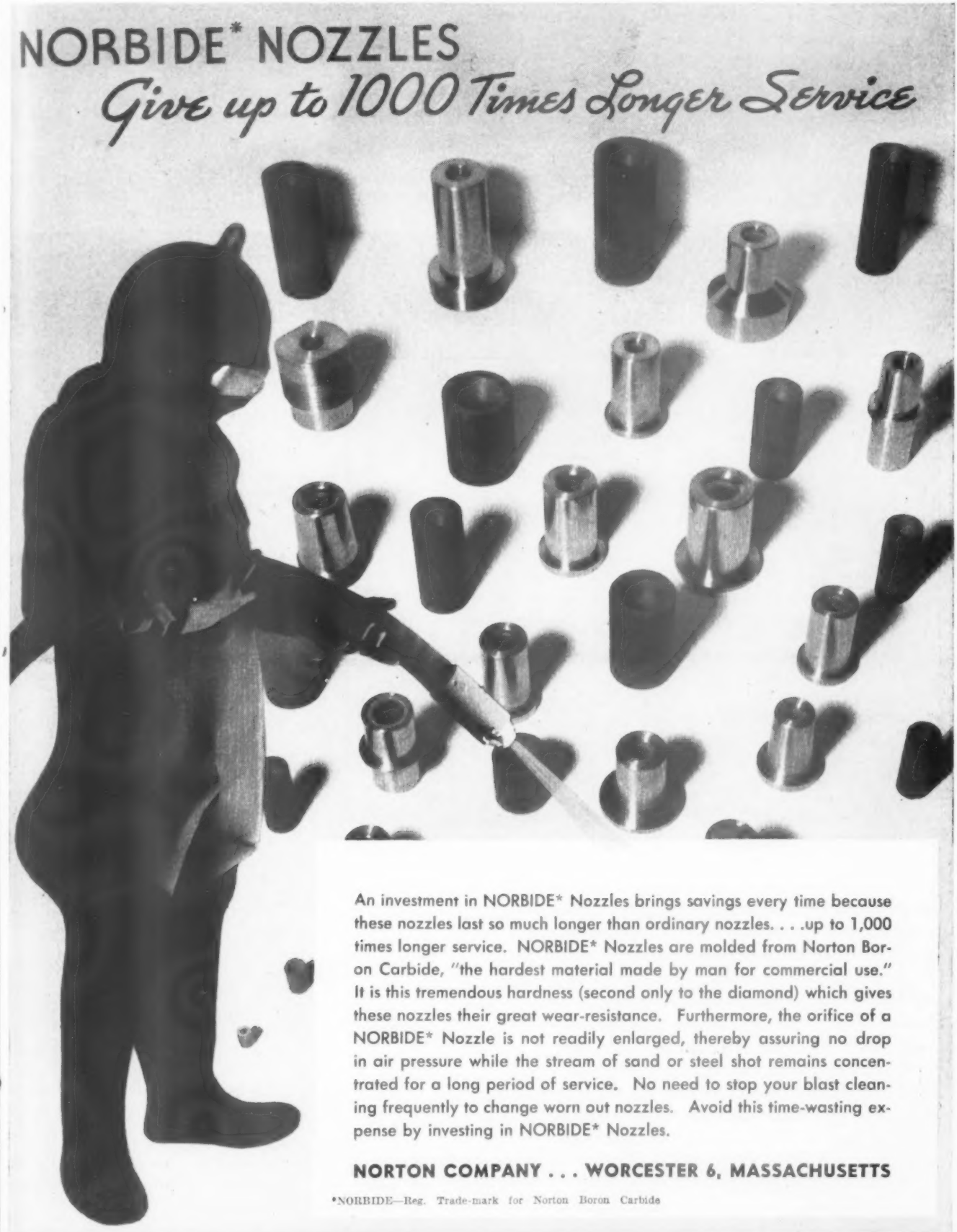
• • •

Howell Foundry Co., 661 Los Nietos Rd., Los Nietos, Calif., has obtained building permit for a galvanized iron addition to its foundry building, pro-

(*Continued on page* 220)

NORBIDE* NOZZLES

Give up to 1000 Times Longer Service



An investment in NORBIDE* Nozzles brings savings every time because these nozzles last so much longer than ordinary nozzles. . . .up to 1,000 times longer service. NORBIDE* Nozzles are molded from Norton Boron Carbide, "the hardest material made by man for commercial use." It is this tremendous hardness (second only to the diamond) which gives these nozzles their great wear-resistance. Furthermore, the orifice of a NORBIDE* Nozzle is not readily enlarged, thereby assuring no drop in air pressure while the stream of sand or steel shot remains concentrated for a long period of service. No need to stop your blast cleaning frequently to change worn out nozzles. Avoid this time-wasting expense by investing in NORBIDE* Nozzles.

NORTON COMPANY . . . WORCESTER 6, MASSACHUSETTS

*NORBIDE—Reg. Trade-mark for Norton Boron Carbide

*Hardest Material Made by Man

(*Continued from page 218*)

viding 1600 sq ft additional floor space, costing $2500.

• • •

Gray iron casting production for August in the Philadelphia Federal Reserve district increased 13.8 per cent over that of July and 20.7 per cent over August, 1945, according to the University of Pennsylvania's Industrial Research Department. Malleable iron production dropped 20.7 per cent from July but was up 92.2 per cent from August, 1945. Production of steel castings was up 10.2 per cent from July but was 16.7 per cent under August, 1945. Pig iron and coke supplies were higher than at the end of July but scrap iron supplies were lower.

• • •

Crucible Foundry Co., 5220 Pennington Ave., Baltimore, which began production of nonferrous castings at this address about a year ago, is installing some new equipment and otherwise improving its plant.

• • •

Taco West Corp., 2620 South Park Ave., Chicago, has been formed with Theodore A. Cohen, president, and Richard K. West, secretary-treasurer. The new concern will manufacture and market automatic electronic control devices in the fields of combustion control, gas analysis, pyrometry, process control and allied apparatus.

• • •

Centrifugal Foundry Co., Sherman Blvd., Muskegon Heights, Mich., recently has been incorporated with capital of $625,000 and the firm name changed from Centrifugal Castings Co. Established in September, 1943, the company, headed by Adolph G. Anderson, has been engaged in the manufacture of ferrous castings.

• • •

Buckler Foundry Co., East Alton, Ill., recently founded by William E. Buckler, will specialize in the production of farm implement castings for the John Deere Harvester Works, East Moline, Ill. Mr. Buckler formerly was associated with John Deere and later was with Allis-Chalmers Mfg. Co., Milwaukee.

• • •

James P. McKeon, River Forest, Ill., and James McNamara, Cincinnati, plan to set up a foundry in the old boiler room of inoperative mining property leased by them at Ladd, Ill.

• • •

Anthony Schifflier has a building permit to construct a 40 x 60-ft foundry building costing $4800 at 6512 Wilson St., Florence District, Los Angeles.

• • •

Triple A Metal Craft Corp., 3412 East 22nd St., Los Angeles, will build a 52 x 144-ft foundry building costing $20,000.

• • •

Martin Engineering Co., Kewanee, Ill., has recently completed moving and enlarging its factory and equipment for the purpose of increasing production of its Vibrolator units.

• • •

A. H. Pettinger Foundry, Warsaw, Ind., has been started by Alex Pettinger and will specialize in aluminum job work.

• • •

Muncie Aluminum Foundry, Muncie, Ind., is building an addition to its foundry to house a gray iron casting department.

• • •

Superior Die Casting Co., 17325 Euclid Ave., Cleveland, plans erection of a new $215,000 plant.

• • •

Autrey-Okon Foundry Co. Inc., Bldg. T-438, Bomber Plant, Marietta, Ga., has been recently organized.

• • •

Allis Machine & Foundry, West Allis,

(*Concluded on page 222*)

There's a stock of

SCHUNDLER BENTONITE

near your plant

From any one of the locations shown below . . . you can get prompt shipments of Schundler Bentonite . . . a first quality foundry Bentonite.

Akron, Ohio — Stoller Chemical Co.	Los Angeles, Calif. — F. E. Schundler Bentonite Co. (Inc. of California)
Birmingham, Ala. — Foundry Service Co.	Milwaukee, Wis. — Thomas H. Gregg Co.
Boston, Mass. — Klein-Farris Co., Inc.	Minneapolis, Minn. — Smith-Sharpe Co.
Buffalo, N. Y. — Weaver Materiel Service	Moline, Ill. — Marthens Company
Chattanooga, Tenn. — Ind. and Fdy. Equip. Co.	New Orleans, La. — Barada & Page, Inc.
Chicago, Ill. — Foundry Supplies Co.	Oklahoma City, Okla. — Barada & Page, Inc.
Chicago, Ill. — B. J. Steelman	Philadelphia, Pa. — Penna. Fdy. Sup. & Sand Co.
Chicago, Ill. — Wehenn Abrasive Co.	Portland, Ore. — Miller & Zehrung Chemical Co.
Cincinnati, Ohio — Delhi Foundry Sand Co.	St. Louis, Mo. — Midwest Foundry Supply Co.
Coldwater, Mich. — The Foundries Materials Co.	San Francisco, Calif. — Industrial Supply Co.
Detroit, Mich. — The Foundries Materials Co.	Seattle, Wash. — Carl F. Miller Co.
Dallas, Texas — Barada & Page, Inc.	Tulsa, Okla. — Barada & Page, Inc.
Edwardsville, Ill. — Midwest Foundry Supply Co.	Wichita, Kans. — Barada & Page, Inc.
Hammond, Ind. — The Foundries Materials Co.	Mexico D. F., Mexico — N. S. Covacevich
Houston, Texas — Southwest Foundry Supply Co.	Montreal, Quebec, Canada— (All Provinces) — Canadian Industries, Ltd.
Kansas City, Mo. — Barada & Page, Inc.	
Long Island City, N. Y. — F. E. Schundler & Co., Inc.	
Los Angeles, Calif. — Ind. Fdy. Supply Co.	

F. E. SCHUNDLER & CO., INC.

520 RAILROAD STREET • JOLIET, ILLINOIS

SCHUNDLER

BENTONITE

The right oven for your work pays dividends in maximum production and lower costs!

There's a time-proven

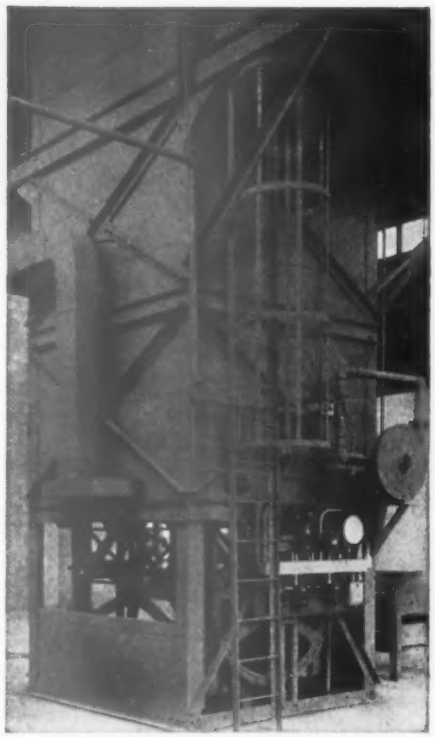
CARL-MAYER OVEN

for every foundry need

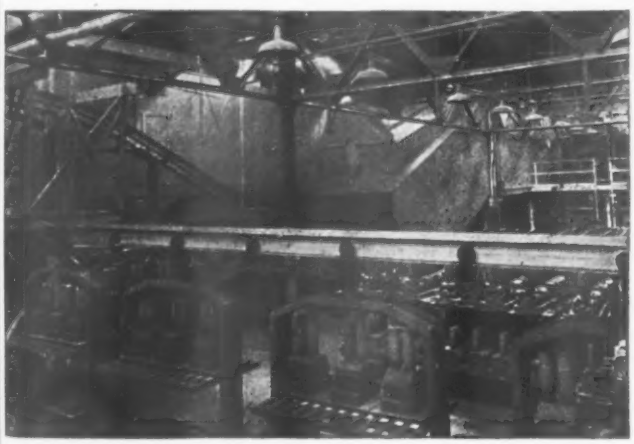
Those in charge of production in America's leading foundries know their responsibility. To insure fast core baking, uniform core baking with operating economy, Carl-Mayer oven equipment is chosen repeatedly.

Want the users' verdict? We'll gladly arrange contact with customers in your locality. *Write for Bulletin.*

RACK
CAR
SHELF
(Quick Dry)
PORTABLE
DRAWER
VERTICAL
MONORAIL
AND
HORIZONTAL
CONVEYOR
TYPES



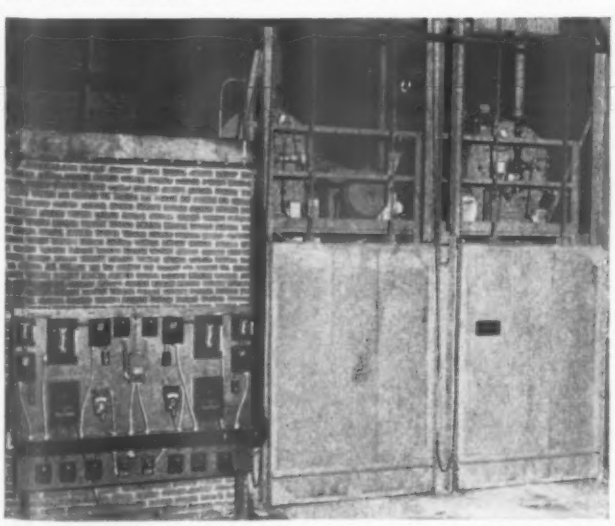
CARL-MAYER VERTICAL CORE OVEN in brass foundry of The H. B. Salter Co., Marysville, Ohio, manufacturers of heating and plumbing fixtures.



CARL-MAYER MONORAIL CORE OVEN at Packard Motor Car Co.

IMPORTANT CONCERNS LIKE THESE HAVE CHOSEN CARL-MAYER OVENS:

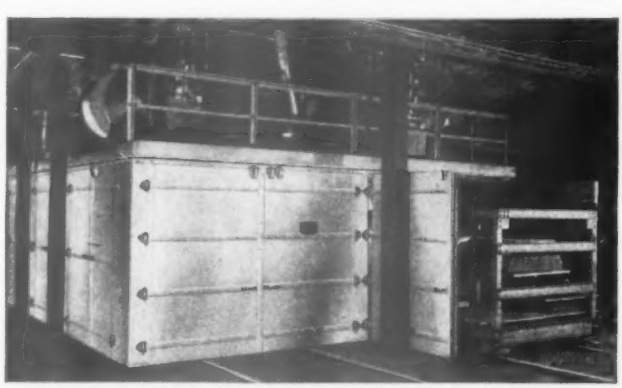
Aluminum Co. of America
American Radiator Co.
Brown Industries
Bucyrus-Erie Co.
Crucible Steel Castings Co.
Dunkirk Radiator Co.
Eclipse Aviation Division of Bendix Aviation Corp.
Electric Autolite Co.
Ford Motor Co.
Fremont Foundry Co.
General Electric Co.
General Motors Corp. and Subsidiaries
Gilbert & Barker Co.
General Steel Castings Co.
Henry Kaiser Corp.
W. O. Larson Foundry Co.
H. B. Salter Co.
Shenango Penn Mold Co.
Studebaker Corp.
A. C. Williams Co.
Whiten Machine Works
Whiting Corp.



Two Recirculating Oil Fired Double Rack Type Core Ovens with Lift Doors, as installed for The Crucible Steel Castings Co., Lansdowne, Pa.

THE CARL-MAYER CORPORATION

3030 Euclid Av., CLEVELAND, OHIO



CARL-MAYER TWO COMPARTMENT CAR TYPE OVEN for cores and molds. Also has doors on side permitting its use as a rack type oven.

(*Concluded from page 220*)

Wis., has been incorporated by Richard J. Peterson, Evelyn Thelen and Cyrus Shabas as a general foundry and machine shop.

• • •

Utility Electric Steel Foundry, 3334 East Slauson Ave., Vernon, Calif., has obtained building permit for a 48 x 50 ft addition to its plant to cost about $12,000.

• • •

DeZurik Shower Co., is building a new nonferrous and ferrous foundry at Sartell, Minn.

MALLEABLE FOUNDERS STUDY PROBLEMS

(*Continued from page 92*)

tion to inflation.

Military Research—So that the malleable industry may contribute in an even more substantial manner to our national security. (This involves, among others, the development of essential metals less brittle and more resistant to the shocks of atomic bomb attack)—And further so as to help prepare the groundwork for a sufficiently rapid military mobilization of our industry if that unfortunate necessity again arises.

Our general objective is to help production and promote all proper means of more production per man-day, and to help towards developing an increased sense of responsibility and attentiveness to our jobs, as the only means of even approaching economic security.

Mr. Welser then asked John A. Claussen, head of the Pig Iron Section of the CPA, to discuss the problem of pig iron supply for malleable founders, and the possibility of more iron being produced through the subsidy program designed to bring high-cost blast furnaces into production. Mr. Claussen explained that some improvement is being made, since production of foundry and malleable iron increased from approximately 350,000 tons in July to 386,000 tons in August. Not over 40,000 tons of foundry and malleable iron is on hand at the furnaces.

Raw Materials Scarce

Plans are under way to bring in additional furnace capacity in several sections of the country, but critical shortages of coke, and in some districts shortages of iron ore, indicate the possibility that this program may not develop as much pig iron as previously has been estimated by Washington. There is hope of getting some additional output from furnaces now operating, but again the coke shortage may be a factor here. Although the output of pig iron is near record proportions, the loss of 11,000,000 tons during the first half of the year as compared with the similar period in 1945, as a result of strikes, has put the industry in a bad situation.

The first priority demands for the veterans housing program amounted to 50 per cent of total pig iron production, and in certain districts, including Birmingham, eastern Pennsylvania and Pittsburgh, the demand exceeded estimated production of foundry iron. The shortage of scrap has accentuated the problem. It was pointed out in the discussion that pipe foundries are using exceptionally high percentages of pig iron, and the charge was made that these foundries were making little effort to obtain scrap.

Francis J. Buckley, head of the Castings Section of CPA, stated that preliminary reports for August indicate malleable foundries used about 27,000 tons of pig iron to produce approximately 70,000 tons of malleable castings. This was the highest monthly production of malleable iron for the past 12 months. Mr. Buckley also indicated the CPA needs better statistics, and recommended foundrymen speed up the supply of nec-

The New AJAX 125kw. Furnace for the Aluminum Alloy Foundry

• Especially designed for the melting of finely divided aluminum alloy particles like turnings, chips and unbaled foil. This furnace is operated on the twin coil induction principle. Oxidation losses are reduced considerably, and yields of 95% to 96% of the dry weight of the charge are obtained with this unit, in view of the rapid melting and the low temperature prevailing in the hearth during the melting operation. These units promise large savings in the recovery of aluminum alloy scrap of all kinds, in addition to all the other advantages of induction melting.

AJAX TAMA-WYATT INDUCTION MELTING FURNACE

Associate Companies: AJAX METAL COMPANY, Non Ferrous Ingot Metals and Alloys for Foundry Use
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

essary data to the agency.

Warren Huff, head of the Metallics Division of OPA, discussed the new price regulations on scrap. He indicated that there has been an improvement in the scrap supply since the recent OPA action, but that this was expected. Time alone will determine if the decisions of the OPA with regard to scrap will be of benefit to the foundry industry. It was suggested to Mr. Huff that pressure be brought to bear on soil pipe producers to force the use of a substantial percentage of scrap in the cupola mixture, so that the entire ferrous foundry industry might have some pig iron to meet important civilian demands.

Harry M. Laws, New Haven Malleable Iron Co., New Haven, Conn., a member of the Malleable Iron Industry Advisory Committee to the OPA, stated the committee had arranged with Dun & Bradstreet to collect statistics from the malleable iron industry in an effort to determine if the sample, now employed by the OPA, is representative of the industry. The industry also is studying the possibility of securing an overall industry price formula to apply to new work, and is preparing statistics looking toward eventual decontrol of pricing.

Discusses Price Control

The remainder of the morning session was devoted to discussion of price control problems in which Mr. Huff, Joseph Meier of the Castings Section of OPA, and members of the industry participated. While representatives of OPA indicated that decontrol could be considered at such a time as the supply and demand of malleable castings is in balance, shortages of pig iron and scrap prevent the realization of that condition at the present time.

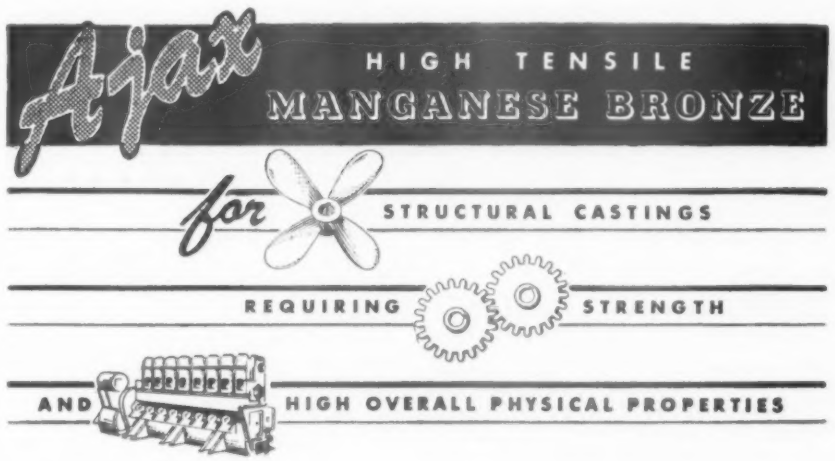
The afternoon session was devoted entirely to reports of committees, with President Shumann presiding. Frank O. Parker, Dayton Malleable Iron Co., and chairman of the Publicity Committee, stated his group was concerned over the inability of some consumers of malleable iron to secure malleable castings. He stated that some competing materials are converting this business and that the situation will react to the disadvantage of malleable foundrymen when normal markets return. Mr. Parker referred to the publication of "Malleable Iron Facts" and discussed possible changes in approach for several future issues. Upon recommendation of the Publicity Committee, the society voted to authorize the Publicity Committee to proceed with the production of a motion picture dealing with the production, application and engineering properties of malleable iron.

Cal C. Chambers, Texas Foundries Inc., Lufkin, Tex., and chairman of the Program Committee, presented a schedule of meetings of the society, which was approved by the members.

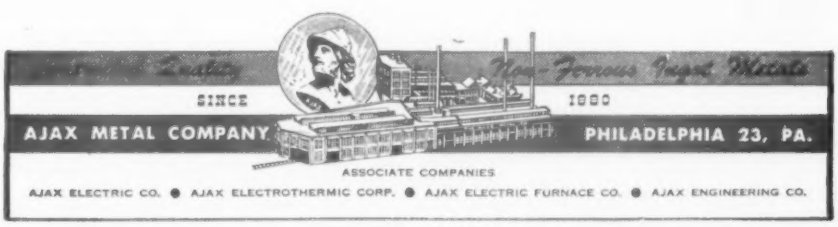
John A. Wagner, Wagner Malleable Iron Co., Decatur, Ill., and chairman of the Cost Accounting Committee, reported the group has been devoting considerable time to a revision of the cost accounting manual of the society, and that it is anticipated the work will be completed and in the hands of the membership by the first of the year.

George J. Behrendt, Eastern Malleable Iron Co., Naugatuck, Conn., and chairman of the Society Committee on Plant Operations, outlined changes that are planned in connection with statistical reports prepared by that committee. He recommended a careful study of the apprenticeship training programs of the members, since in his opinion, steps must be taken to train more molders. He also stressed the importance of studies on job evaluation and rate setting.

Frank S. O'Neil, Link-Belt Co., Indianapolis, presented the report of the Educational Committtee. This committee has been functioning with the Joint Educational Committee of Ferrous Foundries in the development of a pro-



Designers and foundrymen, charged with the gigantic responsibility of specifying engineering materials for the products of a world once again at peace, are closely scrutinizing the widest range of selectable materials ever offered to industry. Of primary importance is the direct consideration of Performance; and, decisions thus made must, of necessity today, be tempered with new emphasis on total Cost. An alloy, therefore, which measures high in strength, toughness and corrosion resistance—which has cut its eye-teeth long ago on marine castings and fittings, engine bases, pump bodies, gears, etc.—yet permits the foundryman to produce solid castings perfectly free from surface imperfections and which leave the sand bright and clean—and will take a mirror-like polish —an alloy like that deserves investigation. A metal of such calibre is Ajax High Tensile Manganese Bronze. Produced under rigid laboratory standards to constant formulae, this Ajax ingot has established recognition as the highest quality manganese bronze available. Write for complete data NOW.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gram of training at Massachusetts Institute of Technology, Cambridge, Mass.; Cornell University, Ithaca, N. Y.; Case School of Applied Science, Cleveland; University of Cincinnati, Cincinnati; and Purdue University, Lafayette, Ind.

A subcommittee of the Educational Committee of the society under the chairmanship of Mr. O'Neil is working on the problem of foundry training in high schools. Special studies of the set-up at Arsenal High School, Indianapolis, are now under way and will be completed shortly.

Leon J. Wise, Chicago Malleable Castings Co., Chicago, outlined the work that is being carried on by the Research and Product Improvement Committee. Special emphasis was placed on the value of the society laboratory, and on the need for greater participation of malleable foundrymen in the work of Committee A-7 of the American Society for Testing Materials.

The meeting was closed with a brief talk by H. S. Colby, executive vice president of the Malleable Founders' Society. Mr. Colby complimented the various committee members on the excellence of the work now under way, and predicted a very busy year for all the committee members and the home office staff of the society.

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IMPREGNATION OF MAGNESIUM ALLOY CASTINGS

(*Continued from page 85*)

castings with the styrene-linseed oil copolymer. The first method used is a batch process wherein a number of castings are treated at once, and is used for quantity production. The second method is similar to the first but handles only one casting at a time, and is used where the cost of production equipment is not warranted.

Fig. 1 shows a diagram of the setup used for the batch process. As can be seen, the equipment consists of the following items:

1. A storage tank for storing the completely mixed solution. This tank is provided with cooling coils in order to maintain the temperature of the solution below 70 F. It is connected, by means of a valved pipe line, to—
2. An autoclave or impregnator in which the castings are placed which are to be impregnated.
3. A vacuum pump to permit evacuation of the autoclave.
4. Shop air, or other source of air pressure to permit pressuring the autoclave.
5. A rinse tank for washing the impregnated castings.
6. A ventilator hood and blower to remove fumes and vapor.
7. A ventilator hood and blower to remove fumes and vapor.

The actual impregnation procedure is carried out in the following steps:

Preparation of castings

1. Rough castings are pickled in an aqueous 0.3 per cent solution of sulphuric acid for a long enough time to remove at least 0.002 in. from the surfaces. Machined or partially machined castings are not pickled but are cleaned in a vapor degreaser or by a similar process.
2. Rinse in cold water followed by a dip in hot water to facilitate drying.
3. Dry castings for about 1½ hours at 250 F.
4. Allow castings to cool to room temperature and place them in the empty impregnator.

Impregnation Procedure

5. Close lid of impregnator tightly, and apply a vacuum of 27 in. Hg or better

(*Continued on page 226*)

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(*Continued from page* 224)

for 20 minutes, in order to evacuate the pores of the castings.

6. Open valve between storage tank and autoclave, and suck the styrene-linseed oil mixture (at 70 F or lower) into the autoclave in sufficient quantity to cover the castings. Close valve and release vacuum.

7. Apply pressure of 70 to 90 psi by means of shop air or any other convenient means, and hold for 30 to 60 minutes depending on the wall thickness of the castings. This pressure forces the solution into the pores of the castings where porosity exists.

8. Open valve to force solution back into storage tank, close valve, and release pressure.

9. Remove castings from impregnator, drain thoroughly, and rinse in rinse tank in order to remove the excess solution from the surface of the castings. Use kerosene, varsol, Stoddards solvent, or other chlorinated solvent for rinsing.

10. Place castings in oven and heat for two hours at 275 F in order to polymerize the solution in the pores of the castings. It is preferable to use a closed furnace in order to minimize volatilization of the solution.

11. Allow castings to cool and then pressure test. In cases of severe porosity, two impregnations may be required before all leaks are sealed. If leakage still occurs after the second impregnation, it is generally best to scrap the casting, since other foundry defects are probably present.

When castings are to be impregnated individually they are prepared in the same manner as described in steps 1-4. All openings in the casting except one are then plugged, and the casting is filled with the impregnating solution. The remaining opening is then sealed with a cap through which air pressure can be applied.

Air pressure of 70 to 90 psi is applied and held for at least 15 minutes, but preferably until the solution oozes slowly out of the porous areas. The castings are then drained, rinsed, and baked as described previously.

In order to assure the best impregnation, and in order to insure that the solution remains stable and does not polymerize in the storage tank, it should be checked at periodic intervals by means of two simple laboratory control tests. These control tests are made as a check on the viscosity and polymerization time of the solution, and are described below.

Determination of Polymerization Time of Styrene-Linseed Oil Copolymer

Apparatus:

1—Low form standard 1000 ml beaker (height 145 mm, diameter 106 mm).

3—Test tubes (15 mm x 75 mm) with a mark near the bottom to indicate 5 ml.

3—Corks so perforated that a glass rod 3 mm in diameter may be moved freely.

3—Glass rods 3 mm in diameter and about 100 mm long.

1—Masonite cover for the liter beaker with holes in it for test tubes and a thermometer.

1—300 F thermometer about 100-150 mm long.

1—Tripod on which to set beaker.

1—Bunsen burner.

1—Quart of oil whose flash point is 300 F or higher.

Procedure:

Fill the beaker with oil to about 1 in. from top. Place the thermometer as shown in Fig. 2, so that the bottom of the thermometer will be level with the bottom of the test tubes. Place beaker on tripod, and heat with bunsen burner until the oil temperature remains steady at 275 F, then place the three tubes, each containing 5 ml of the sample of copolymer to be tested in the bath, and place the stirring rods in the tubes. Re-

(*Continued on page* 228)

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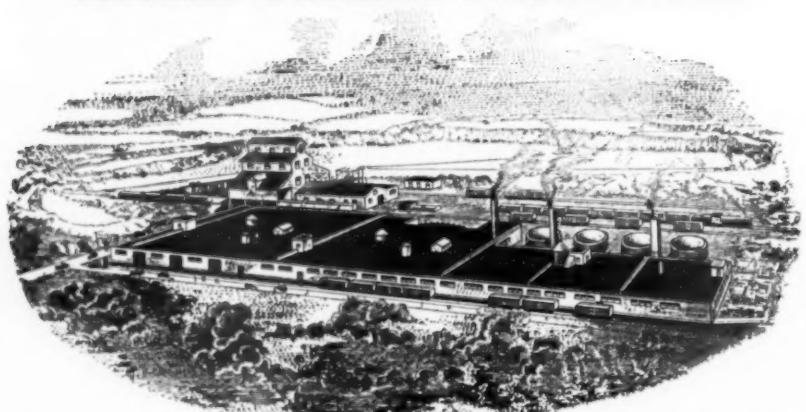

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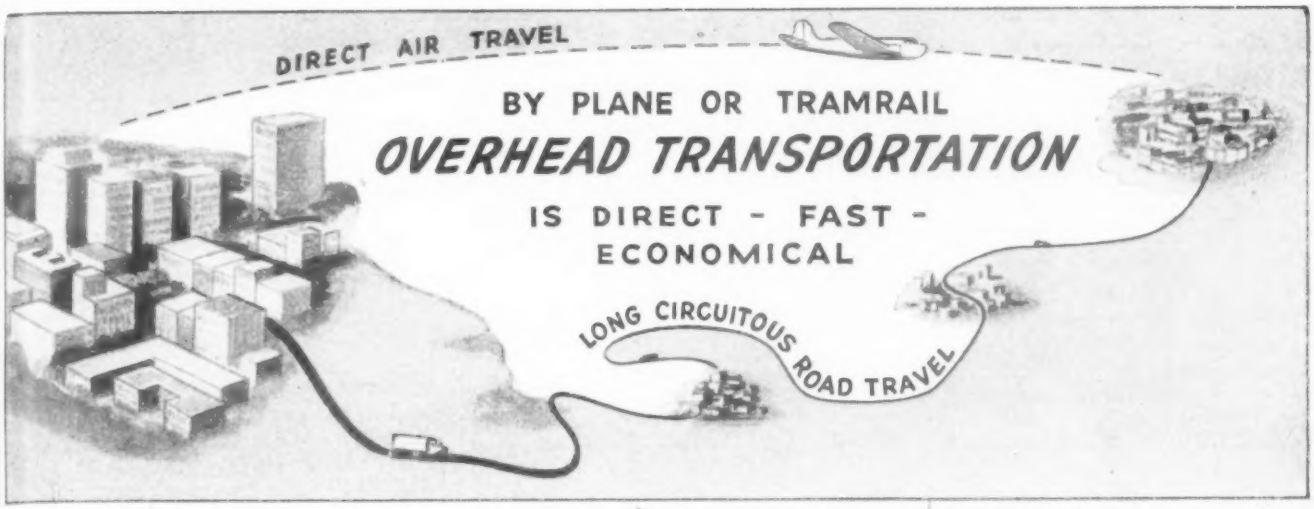

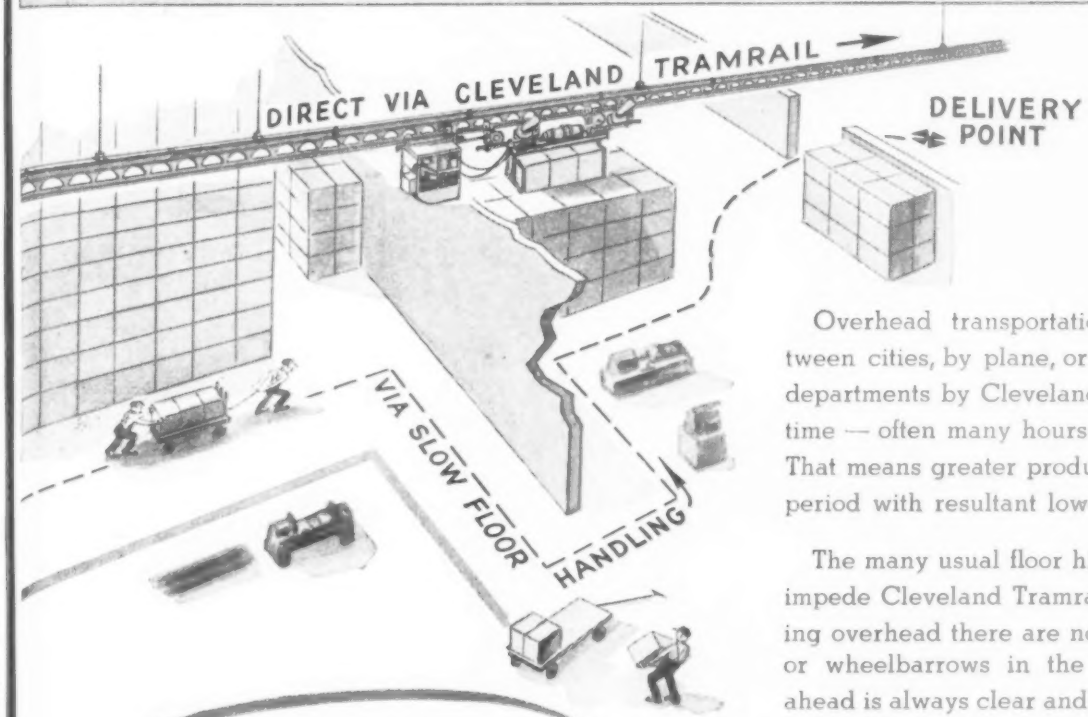

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(*Continued from page 226*)

cord the time. The temperature should be kept at 275 F ± 5 F.

Examine the samples once every 5 minutes for the first 40 minutes by lifting the glass rods and observing the action. When the samples have been in the bath for 40 minutes, raise the glass rods at intervals of one minute. Note the point when each sample becomes firmly set. This point is determined in the following manner: Grasp the rod at point A Fig. 2, with the thumb and forefinger. The end point has been reached if, when the rod is slowly lifted, the test tube is raised at least 1 in. out of the bath before the rod leaves point *B*. This can be judged by the relative position of the thumb and forefinger to the cork in the test tube. The time in minutes required for the sample to act in the above manner is the polymerization time. This time should be approximately 40 to 50 minutes for an average of the three samples.

Determination of Viscosity of Styrene-Linseed Oil Copolymer

Apparatus:

1—No. 200 Fenske modified Ostwald viscosimeter, Fig. 3.

1—ASTM thermometer (56F - 80F)

1—Mechanical stirrer.

1—Water bath.

1—Stop watch.

Carbon tetrachloride, benzol or toluol.

Procedure:

The viscosimeter is cleaned by rinsing twice with benzol, toluol, or carbon tetrachloride. The solvent is then removed by passing air through the viscosimeter.

The solution is maintained at a temperature below 70F in the impregnation and storage tanks. From the time the sample is taken until the viscosity has been determined the solution should be placed somewhere so that its temperature will remain as close to 70F as possible. The temperature positively must not exceed 90F before the viscosity has been determined.

The solution is charged into the viscosimeter in the following manner: Hold the instrument in an inverted vertical position with the end of the capillary arm *A*, Fig. 3, immersed in the impregnating solution. Fill bulbs *B* and *E* and bring the solution into the working capillary up to line *D* by applying suction at *I*. The rubber tubing used in applying the suction must be clean. After filling, the excess solution is wiped from the top of the viscosimeter, and the viscosimeter then is placed in a constant temperature water bath held at 70F ± 1F. It is immersed so that bulb *B* is below the surface of the water.

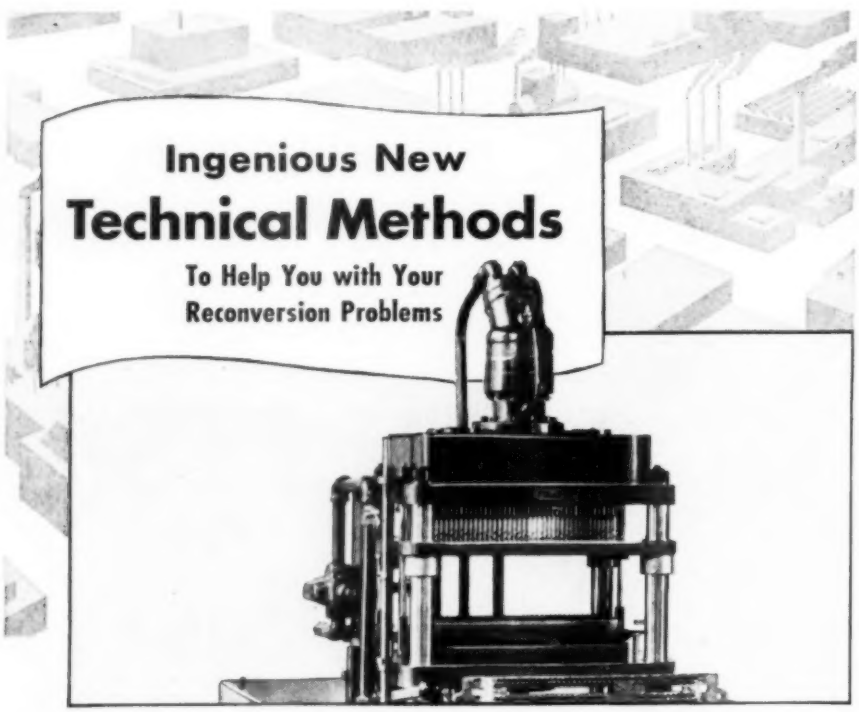
Adjusted to Vertical Position

The viscosimeter is adjusted to a vertical position by eye, and remains in this position in the bath for about 5 minutes in order to reach the bath temperature. During this time the solution will drain from the upper bulbs into the reservoir *H*. If any air bubbles are trapped in the bend at *G* in the course of this operation, it is important that this air be removed so that there is an unbroken column of oil extending from the lower reservoir through the capillary during the test.

After the sample has attained the bath temperature, pressure is applied at *I* to force the sample about ¼-in. up into bulb *B* above line *C*. The time required for the meniscus to fall freely from line *C* to line *D* then is measured and recorded. Viscosity of the copolymer in centistokes can then be obtained by multiplying the efflux time in seconds by the viscosimeter constant. The viscosity should be between 9 and 27.5 centistokes, and preferably between 10 and 20 centistokes.

If these control tests show that the polymerization time is too long, more catalyst should be added to the solution until the time is in the proper range. If the solution is too viscous, more catalyzed styrene-linseed oil should be

(*Concluded on page 230*)



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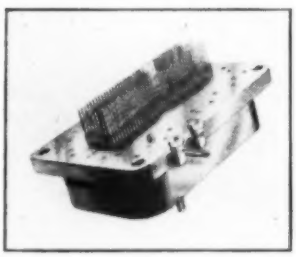

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(*Concluded from page 228*)

added. In normal operation, however, as fresh solution is added to replace drag out, the polymerization time and viscosity should remain within the required ranges, provided the storage tank temperature is maintained at 70F or lower.

Summary

1. The three theories for the occurrence of microporosity in magnesium alloy castings have been discussed (in the preceding article) on the basis of the constitution diagram. They are as follows:

   a. Lack of proper feeding during final stages of solidification.

   b. Difference in solid solubility of the dissolved constituents at different temperatures.

   c. Tearing along the interface of the primary and secondary constituents due to tension stresses set up during contraction on cooling.

2. It has been shown that microporosity does not adversely affect the mechanical properties of commercial magnesium alloy castings.

3. The main objection of microporosity is the fact that it causes leakage in parts which must withstand liquid, air, or gas pressure during operation. This leakage might ordinarily be the cause for rejection of otherwise satisfactory castings on the basis of pressure test.

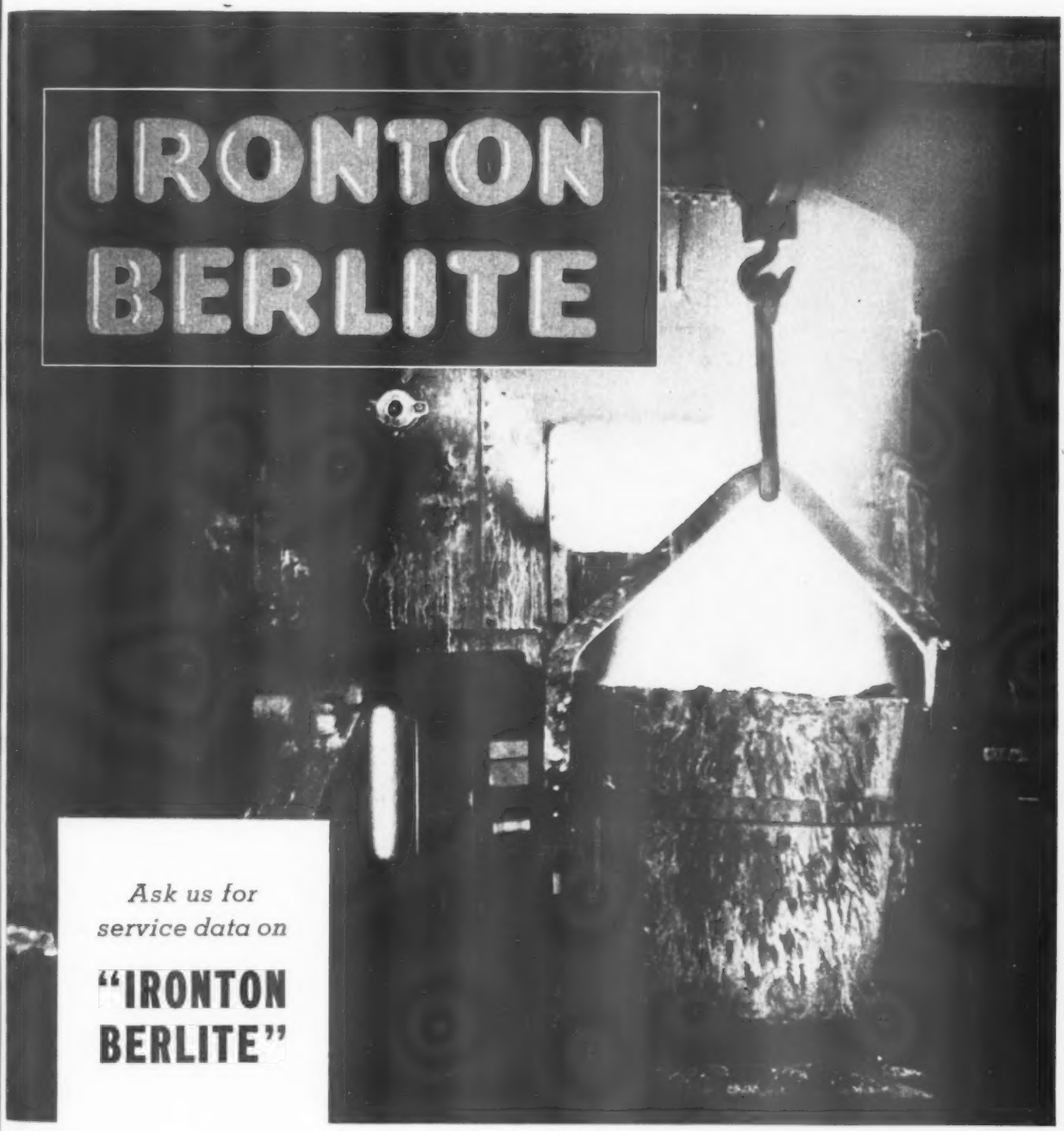
4. Methods are discussed and sealants described for impregnating porous castings in order to minimize these rejections. These impregnation procedures seal up porous areas without covering up serious foundry defects, and without otherwise producing harmful effects.

AFA Organizes New Sand Division

Formation of a sand division within the Amercian Foundrymen's Association has been announced by S. C. Massari, technical director. The new division is an outgrowth of the organization's sand research project started in 1921. Technical phases of the sand research project at Cornell University will be under the jurisdiction of the division's subcommittee on physical properties of steel foundry sands at elevated temperatures.

Chairman of the new division is Dr. H. Ries, former head of Cornell's geology department and internationally known sand and clay authority who has been technical adviser to the society's sand project since 1929. P. E. Kyle, professor of metallurgy, Cornell, is vice chairman, and H. F. Scobie, AFA educational assistant, serving temporarily as secretary.

Any interested AFA member may register for membership in the new division, according to Mr. Massari.



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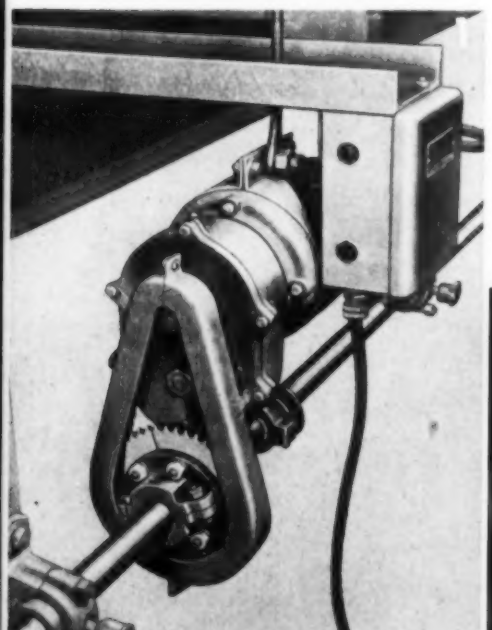
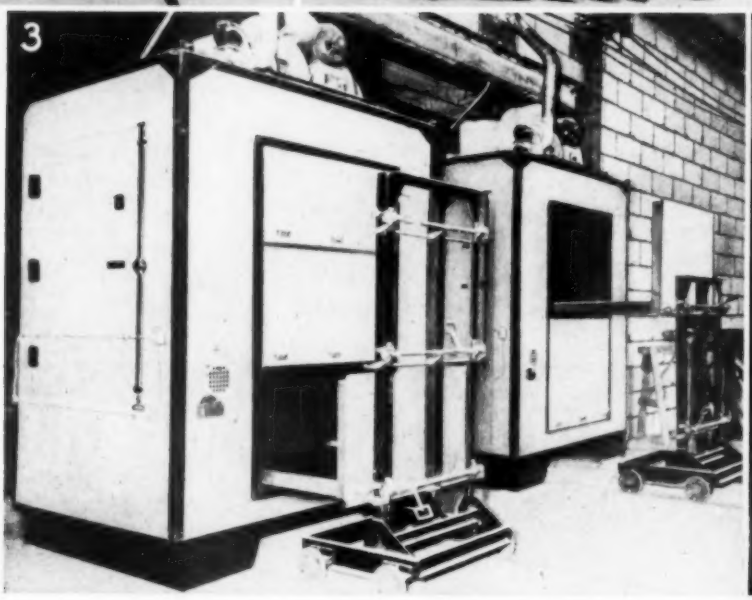


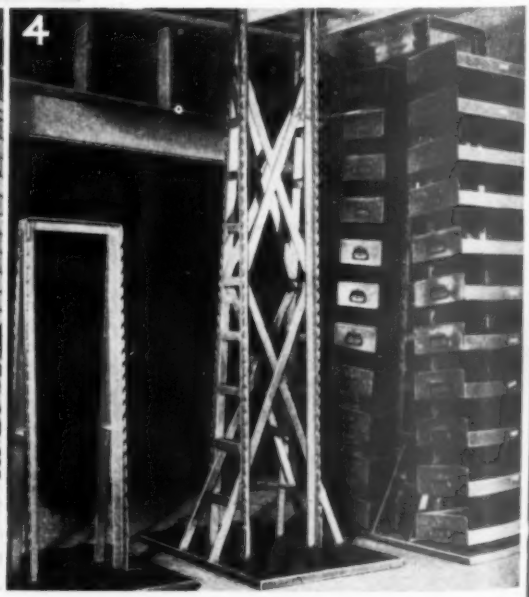
(2)—Grinding Wheels: Norton Co., Worcester 6, Mass.—Grinding wheels made with a new aluminum oxide product are said to have a faster and cooler cutting action, longer life and require fewer dressings. The grains of this new abrasive form in the electric furnace as individual crystals which do not require any crushing to size. Crystals assume a chunky, nubby shape with many angles which increase the cutting efficiency of the grains. In field tests grinding wheels made with this new abrasive have proven especially effective for snagging castings with portable grinders and for surface, tool and internal grinding.

(3)—Oven: Gehnrich Oven Division, W. S. Rockwell Co., 210 Eliot St., Fairfield, Conn.—Pull-drawer oven has no overhanging obstructions, the drawers being supported on a puller mechanism with ball bearing wheels riding on a track in the floor and extending only 15 in. in front of oven. Puller engages any one or all the drawers and is easily operated by one man. In the installation shown, heat is supplied by electric heaters nested at one side and baffled from the heating chamber. Where gas, oil or steam heating is desired, an air heater may be installed on the oven roof, or gas or oil burners may fire into a combustion chamber at one side of the oven from which heat is drawn and discharged horizontally across the work, returning through the heater in a rapid, constantly recirculating motion. An exhaust fan on the roof is supplied where required for purging the oven of undesired vapors. The oven is equipped with all necessary interlocking temperature and heat supply safety equipment and has proved satisfactory for core baking, mold drying, low temperature drawing and heat treating of metals.

(4)—Tray Rack: Rack Engineering Co., Butler St., Pittsburgh 1—Rack will accommodate a two-ton load and

(*Continued on page 234*)





9 pounds of Ni-Rod saved this $150 casting

After this pipe guide barrel had been cast, the foundry discovered that the pattern had been made too small on four projections.

The damage was done... *but not permanently.* For the foundry was able to do a perfect build-up job with Ni-Rod.

Each of the 4 areas shown in the accompanying sketch were ground down in preparation for the welding. Then, using 5/32" electrodes, Ni-Rod was deposited at 130 amps, d.c., reversed polarity. Seven passes were made to build up 3 layers. After welding, the deposits were peened and machined to the correct over-all dimension of 22" + 0.000" − 0.032".

No preheat was necessary.

Said the welder, *"Ni-Rod is the best rod I ever used on cast iron."*

* * * * *

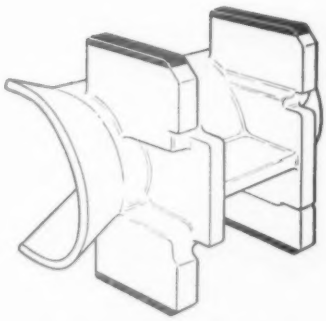
Money-saving repairs and enthusiastic comments like this are typical of Ni-Rod.

Why?

Because smooth-handling Ni-Rod gives you *strong* welds... *sound* welds... *machinable* welds... and usually *without* preheating.

If you haven't tried Ni-Rod, order a package today. Rods come in 1/8", 5/32" and 3/16" diameters. There'll be plenty of times when you can use Ni-Rod for quick, easy and money-saving repairs on defective castings.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.



WHERE THEY BUILT UP THE CASTING WITH NI-ROD

Each of the 4 darkened projections was ¼" too short. By building up the undersize areas with only 9 pounds of Ni-Rod, an otherwise perfect casting (worth $150) was saved. Over-all length and height: 28" x 22". Weight: 300 lbs. Area of repair: 2" x 10".

SEND FOR INSTRUCTION BOOKLET

INCO NI-ROD TRADE MARK

NI-ROD IS DISTRIBUTED BY:

WHITEHEAD METAL PRODUCTS COMPANY, INC.—Baltimore, Boston, Buffalo, Newark, New York, Philadelphia, Syracuse
WILLIAMS and COMPANY, INC. — Cincinnati, Cleveland, Columbus, Pittsburgh, Toledo
STEEL SALES CORPORATION — Chicago, Detroit, Indianapolis, Milwaukee, Minneapolis, St. Louis
PACIFIC METALS COMPANY, LTD. — Los Angeles, San Francisco
J. M. TULL METAL & SUPPLY CO.—Atlanta
EAGLE METALS COMPANY — Portland, Seattle
METAL GOODS CORPORATION—Dallas, Houston, New Orleans, Tulsa
HENDRIE & BOLTHOFF MFG. & SUPPLY CO. — Denver
ROBERT W. BARTRAM—Montreal
ALLOY METAL SALES, LTD.—Toronto
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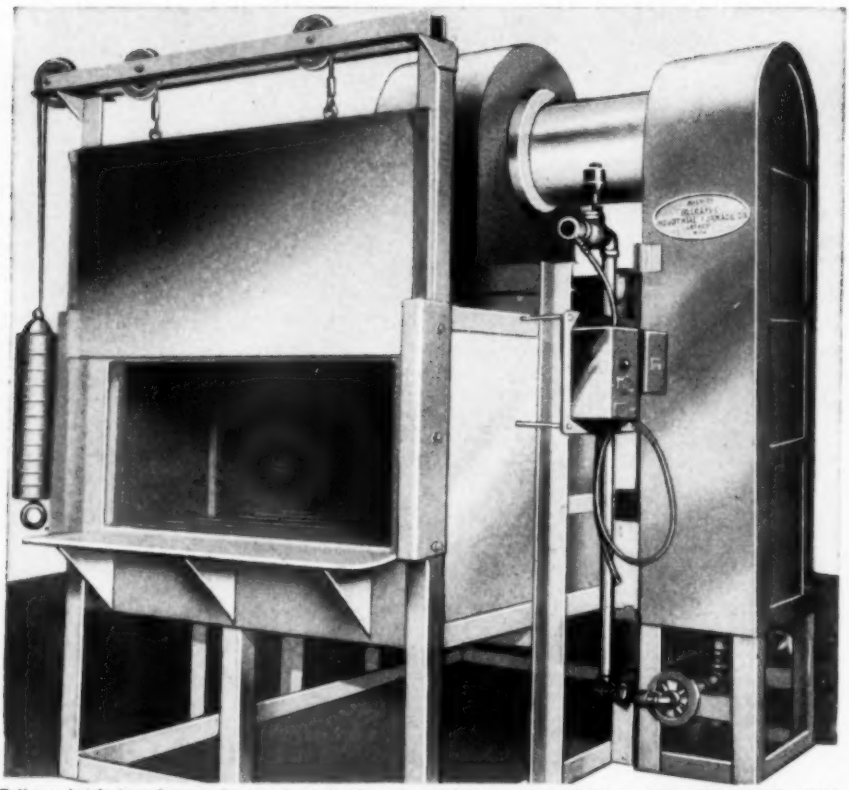
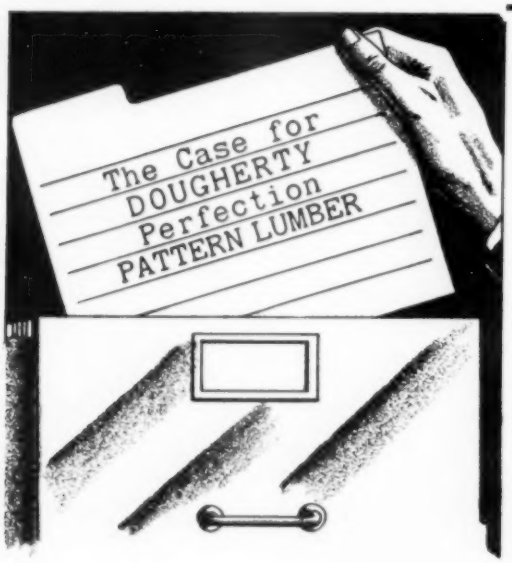
METAL & THERMIT CORPORATION*
HOLLUP CORPORATION*
NATIONAL CYLINDER GAS COMPANY*
**Offices in principal cities*



Bellevue batch type furnace for the heat treating of aluminum alloys, consists of atmospheric type burner mounted on the lower end of the duct which is used for recirculating the air back into the furnace. Garden City high temperature fan is standard equipment for recirculating the heated air. This method of heating holds temperature with little or no variation. Mounting the burner in the duct eliminates the necessity of an extra heating unit. . .send us your heat treating problems. . . our engineers will make a proposal without obligation.

Bellevue INDUSTRIAL FURNACE COMPANY

2971 BELLEVUE — *Since 1910* — DETROIT 7, MICH.



Lower, final pattern costs because of the workability of Dougherty Perfection Pattern Lumber. *Better patterns* for this is a pattern lumber that resists warping and cracking . . . two points that make the "case" for Dougherty Perfection Pattern Lumber—that make it your number one choice every time!

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Phone: HEmlock 0700

LUMBER COMPANY

(*Continued from page* 232)

contains a working surface of 70 sq ft yet requires only 10 sq ft of floor space. Trays are never manually handled when loaded, and therefore may be filled to capacities of 300 lb each. Selecting or replacing trays from any position on the rack is easily accomplished through the use of a power lift truck. Ceiling between trays may be raised or lowered to meet material handling requirements.

Loading Bridge: Craig-Holden Associates, Box 866, Fort Worth, Texas—Safety loading bridge for use on freight car loading platforms has a positive lock-

ing device, side guards and nonskid surface with beveled edge for easy entry. High quality steel is used throughout in the construction.

Polishing Wheel: Raybestos-Manhattan Inc., Manhattan Rubber Division, Passaic, N. J.—Flexible soft neoprene bonded polishing wheel is used for finishing on stainless steel, glass, nonferrous and precious metals. It is supplied in the finer abrasive grain sizes or

with pumice, rottenstone or other mild abrasives and is also effective in blocks and rubbing pads. Due to the nature of the soft bond the wheel speed is limited to 3000 sfpm.

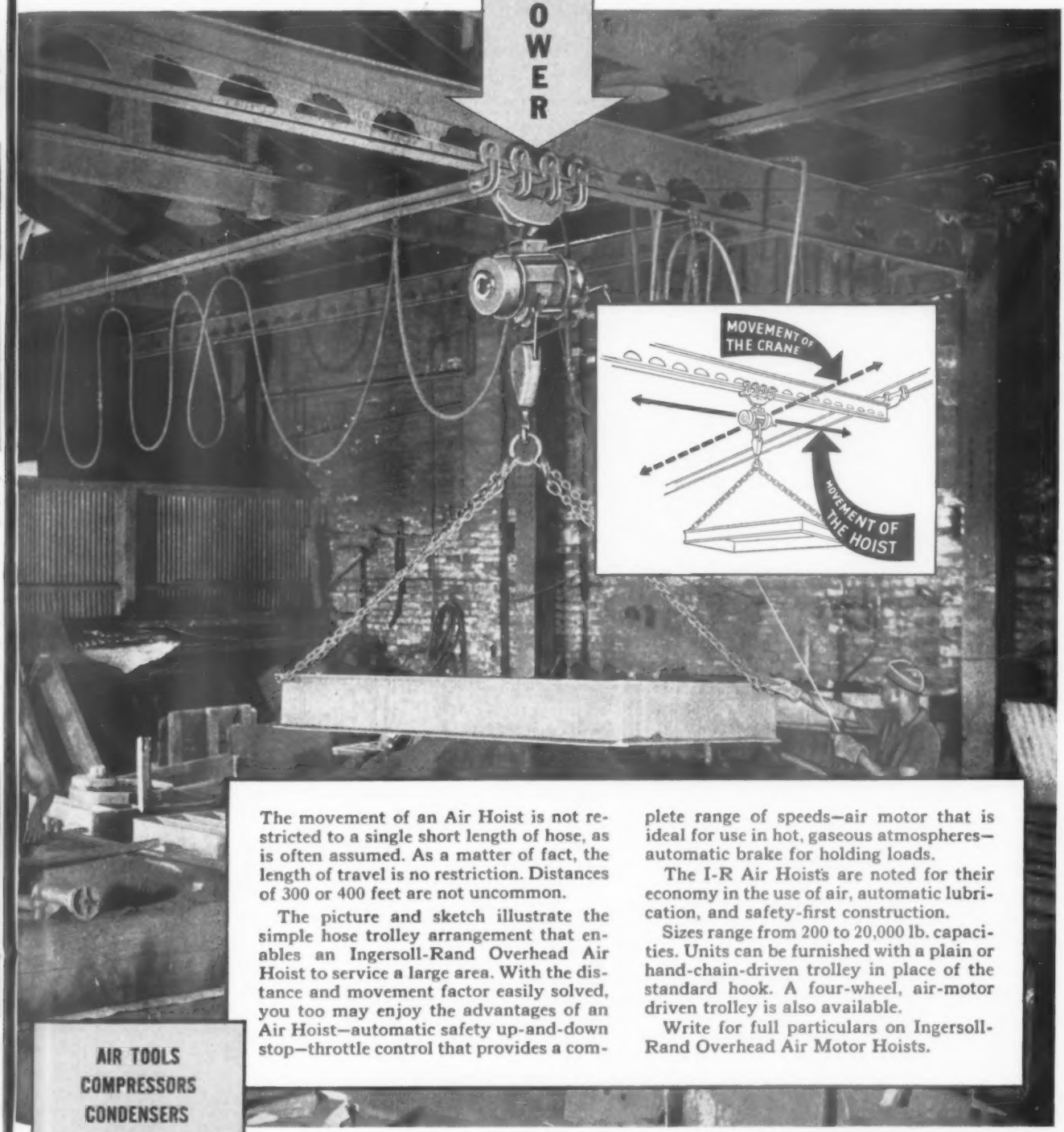
Electrode: Wilson Welder & Metals Co. Inc., 60 East 42nd St., New York 17— Extruded coated electrode

(*Continued on page* 236)

Don't overlook the MOVE of an Air Hoist..

LIFT

LOWER



The movement of an Air Hoist is not restricted to a single short length of hose, as is often assumed. As a matter of fact, the length of travel is no restriction. Distances of 300 or 400 feet are not uncommon.

The picture and sketch illustrate the simple hose trolley arrangement that enables an Ingersoll-Rand Overhead Air Hoist to service a large area. With the distance and movement factor easily solved, you too may enjoy the advantages of an Air Hoist—automatic safety up-and-down stop—throttle control that provides a complete range of speeds—air motor that is ideal for use in hot, gaseous atmospheres—automatic brake for holding loads.

The I-R Air Hoists are noted for their economy in the use of air, automatic lubrication, and safety-first construction.

Sizes range from 200 to 20,000 lb. capacities. Units can be furnished with a plain or hand-chain-driven trolley in place of the standard hook. A four-wheel, air-motor driven trolley is also available.

Write for full particulars on Ingersoll-Rand Overhead Air Motor Hoists.

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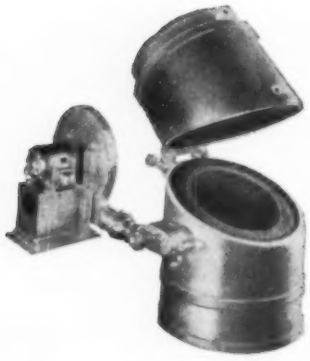

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FOUNDRY ENGINEERS SINCE 1919

A. A. WICKLAND & CO.

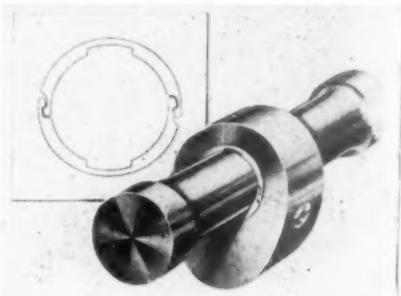
ENGINEERING BUILDING • CHICAGO (6)

TELEPHONE ANDOVER 5922

(*Continued from page 234*)

No. 107 is designed for work involving poor fit-up on mild steel. It is suitable for single or multiple pass welding, rusty or dirty plates or sections and works equally well on ac or straight or reversed polarity dc. Rod conforms to the E-6012 classification of the AWS specification A233-45T and is marked in accordance with NEMA standards.

Retaining Ring: Waldes Kohinoor Inc., Long Island City 1, N. Y.—Retaining ring of two-part interlocking construction forms a complete annular shoulder of uniform section height around the circumference of the shaft thereby eliminating the gap characteristic of conventional open type C rings. Consisting



of two mating halves that interlock, ring is dynamically balanced and is particularly suitable for equipment involving high rates of RPM. Because of its positive interlocking action, the ring cannot be lifted out of its groove by high centrifugal forces or by linear expansion caused by friction with abutting surfaces. Disassembly of the ring requires only a slight prying action with a screw driver.

Electrode: Air Reduction Sales Co., 60 East 42nd St., New York 17, offers a general purpose, mild steel, extruded-coated electrode operating on dc straight or reverse polarity and on ac producing a weld metal of high mechanical properties. It is designed for low cost, single or multiple-pass welding on sections where the fit-up is poor, or the work is rusty or dirty.

Blast-Cleaner: Vacu-Blast Co. Inc., 1054 Broadway, Burlingame, Calif. —Blast device for cleaning or refinishing metal, concrete or other hard surfaces. A feature of the machine is its vacuum return system, which prevents abrasive or other particles from escaping into the open. The vacuum system operates continuously returning grit and refuse to the reclaiming tank, where reusable grit is returned to the blasting system and refuse is shunted into a separate collector. Many types of abrasives may

(*Continued on page 238*)

PROMPT DELIVERY

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Steel Flasks and Slip Jackets

★ *Parting Line* on cope and drag is surface-ground for accurate fit.

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Brush and Spray Can and
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Trigger control means effortless handling and economy of air consumption. Used for Silica wash, oil, water or any liquid material. Used for sand blast cleaning of permanent molds and castings. Without suction hose the Murphy Pistol Sprayer becomes a perfect blow gun, used to advantage for the cleaning of motors and machinery.

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Pipe Size	Price FOB Hamilton, O.
1/16"	$10.00
1/8"	10.00
1/4"	10.00
3/8"	12.00
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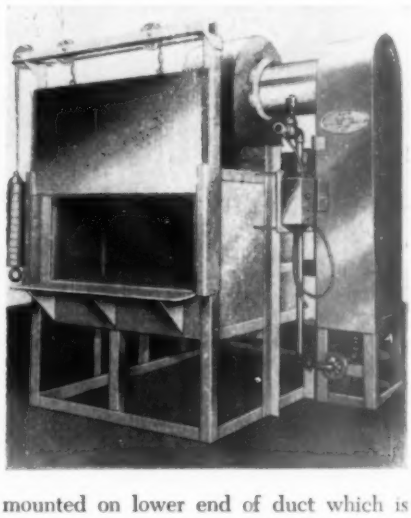
(*Continued from page* 236)

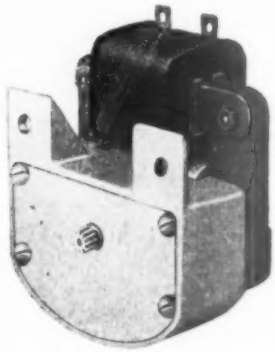
be used, depending upon the nature of the work to be done and the finish desired. Operated like household vacuum cleaner, the machine may be used without special precautions or preparations such as masks, goggles or protective clothing.

Furnace: Bellevue Industrial Furnace Co., 2971 Bellevue, Detroit 7—Batch type furnace for heat treating aluminum alloys has atmospheric type burner



mounted on lower end of duct which is used for recirculating air back into furnace. Mounting burner in duct eliminates necessity of an extra heating unit. High temperature fan is standard equipment for recirculating the heated air. This method of heating holds temperature with little or no variation.

Synchronous Motor: Kurman Electronics Corp., 130 Clinton St., Brooklyn, N. Y.—Self-starting small synchronous motors require an input of only 1½ w and produce a starting and synchronous running torque of 10 in.-oz at 1 rpm. Gears are enclosed in a die



casting which supports the bearings and seals in the lubricant; no re-oiling is required. Rotor shaft runs in a collar of oil rather than running against the high speed bearings surface. The standard

(*Continued on page* 240)

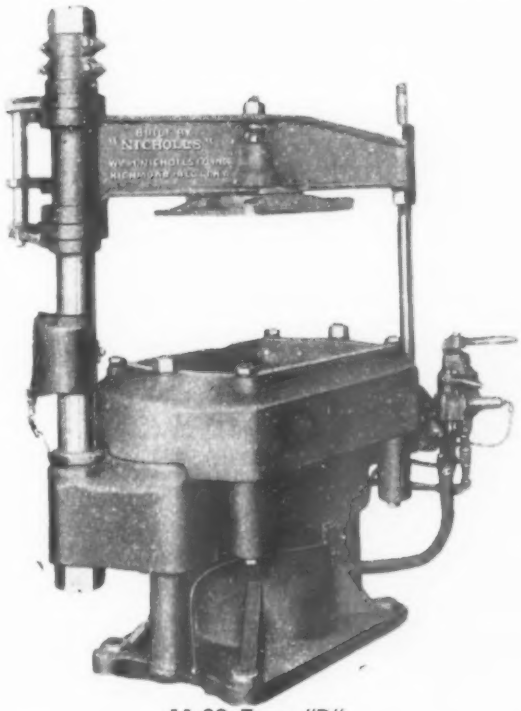
IMPROVED
HEAVY-DUTY
MOLDING MACHINES
Jolt .. Squeeze and Pattern Draw

ACCEPTANCE

The international acceptance of large numbers of NICHOLLS Molding Machines for many years is evidence of their productive capacity combined with low upkeep and reliability. NICHOLLS design and construction is the basis of this reputation.

PRECISION BUILT

Pistons and Cylinders are finished ground to micrometer sizes. All draw pins and guide bushings are case hardened and ground to precision tolerances for perfect fit and smooth operation.



11-32 Type "D"
Shown with Parallel Self-Positioning Squeeze Head

AUTOMATIC CONTROLS

These machines can be equipped with Push Button Control for all operations, including jolt and squeeze timing.

ALIGNMENT

The one piece heavy base and cylinder castings with integral supports for uprights, guide pins, bushings and valve brackets assures rigidity and permanent alignment.

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For satisfactory performance over extended periods, dirt proof housings and forced lubrication have been provided for all parts that might otherwise wear quickly; thereby assuring low upkeep costs.

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USERS: Fargo, Howard, Coeur d'Alene, United Eng. & Fdry., Bethlehem Steel, Birdsboro Steel, Ohio Steel, Hartford Electric Steel, Harrisburgh Steel, U. S. Steel, Detroit Gray Iron.

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2½, 5, AND 10 TON CAPACITIES

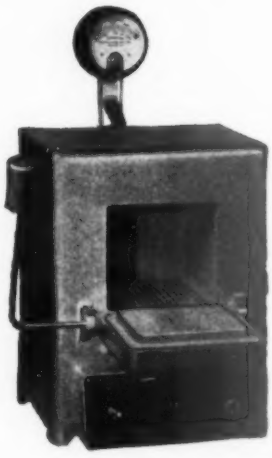
KRANE KAR
TRADE MARK REGISTERED

SILENT HOIST & CRANE CO., 885 63rd ST., B'KLYN 20, N.Y.

(*Continued from page 238*)

motor illustrated is designed to operate on 100-125v, 60 cycles, and has a load shaft speed of 4 rpm. Lower speeds are obtained by adding a gear subassembly of proper ratio. These motors can be furnished for 1 to 250 v and 25 to 120 cycles and either direction of rotation. Overall size: 2 x 2⅜ x 1¼ in.; weight-about 9 oz.

Electric Furnace: Thermo Electric Mfg. Co., 480 West Locust St., Dubuque, Iowa—New furnace for laboratory use or heat-treating small parts will maintain a temperature of 2000 F continuously and automatically hold any selected temperature from 500 F to 2000 F. It will heat up to 1500 F in 30 minutes. Furnace body and door are one-piece aluminum castings. Insulation

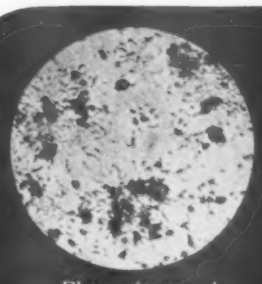


is cast permanently in place inside the furnace body. Heating element completely surrounds the chamber to assure uniform distribution of heat and is protected against damage or chemical deterioration. yet the entire muffle core, with embedded heating element, can be easily removed for replacement if necessary. Control panel on front of furnace contains variable heat control, on-off switch and light indicating when current is on. Heating chamber measures 4¾ x 4¼ x 6 in., with overall dimensions 12 x 15½ x 14½ in.

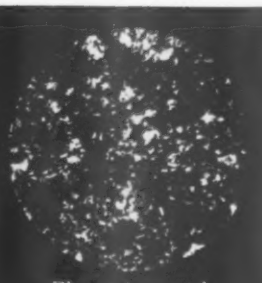
Oxygen Indicator: Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8—Instrument measures oxygen content of gaseous mixtures by use of an electrolytic detector cell. A direct reading meter, having linear scales of 0-0.5, 0.5, 0.10 and 0-25 per cent, indicates the percentage of oxygen in sample. An adjustable high point contacting device can be used for automatic activation of warning signals or control circuits whenever oxygen concentration exceeds a predetermined limit. An electronic recorder or galvanometer potentio-

(*Continued on page 242*)

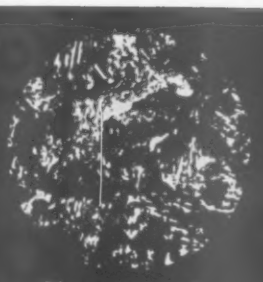
Typical Analysis of Foundry and Malleable Grade *G-IRON PIGS



Photomicrograph
100 diam. unetched.

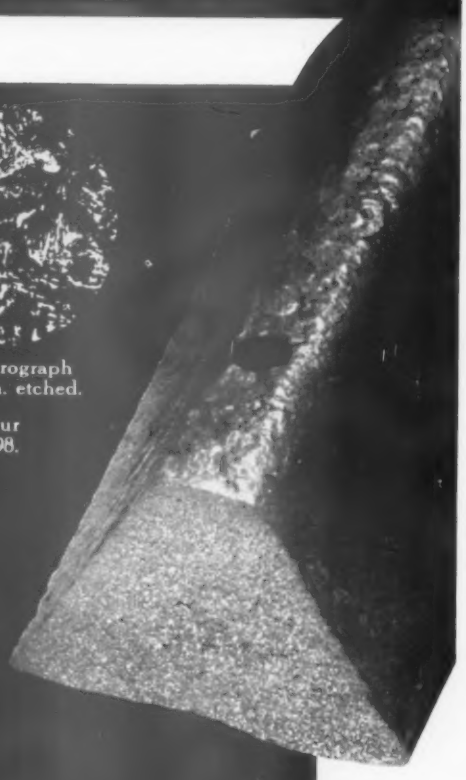


Photomicrograph
100 diam. etched.

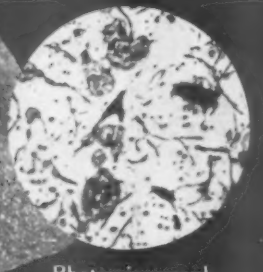


Photomicrograph
1000 diam. etched.

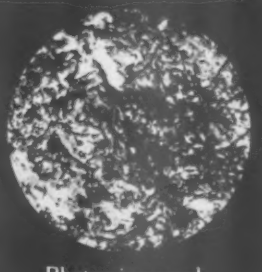
Analysis of this foundry grade G-Iron pig: Silicon 2.38, Sulphur .027, Phosphorous .350, Manganese 1.00, and Total Carbon 3.98.



*G-IRON is graphitized pig iron. A patented blast furnace process refines the grain structure of the pig—and this refinement follows through to the finished product. The finely distributed graphite increases fluidity and reduces chill in thin sections—improves machinability and helps to overcome shrinkage and porosity between thin and heavy sections.



Photomicrograph
100 diam. unetched.



Photomicrograph
100 diam. etched.

Photomicrograph
1000 diam. etched.

Analysis of this malleable grade G-Iron pig: Silicon 2.35, Sulphur .026, Phosphorous .130, Manganese 1.05, and Total Carbon 4.10.

TONAWANDA for sound castings

TONAWANDA IRON CORPORATION

NORTH TONAWANDA, N. Y.

Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

AVAILABLE

for

PROMPT SHIPMENT

LITHIUM METAL

LITHIUM HYDRIDE

LITHIUM COPPER MASTER ALLOY

LITHIUM CALCIUM ALLOYS

LITHIUM SILICON ALLOYS

DIRECT FROM PRODUCER

MAYWOOD CHEMICAL WORKS

MAYWOOD, N. J.

FIRST AVAILABLE

HAND DUMP TRUCKS

Here is a triple-throat "worker"—a handy man you can't do without. Rugged, durable, this truck is built to stand rough working conditions. It is light and mobile to facilitate its operation, and is unexcelled for use as an economical, portable scrap container or for material hauling. It can be used singly or in units drawn by a small power vehicle. Priced at but a fraction of their original cost these like-new all-welded hopper-type trucks can be used for carrying everything from fine sand to steel bars.

Delivered price east of Mississippi (less in quantities) . . . . $11.95 ea.

Phone, Wire or Write

PRICE IRON & STEEL CO.

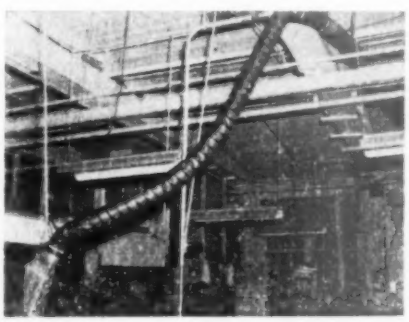
Peoples Gas Bldg. HAR. 8140 Chicago 3, Ill.

(*Continued from page* 240)

meter recorder may be attached to obtain a permanent and graphic record of readings.

Sand Blast Cabinet: Leiman Bros. Inc., 133 Christie St., Newark 5, N. J.—Cabinet door having armholes with cuffs can be swung open to permit ingress or egress of articles to be sand blasted. Motor driven rotating tumbling basket tumbles small parts in the sand spray. For cleaning larger work, basket can be removed to make more room, and operator then holds work under spray by inserting his arms through armholes. Sand from magazine is fed automatically through nozzle and is returned to magazine by gravity for reuse.

Exhaust Duct: Warner Brothers Co., Spiratube Division, Bridgeport 1, Conn.—Flexible tubing is suitable for semi-permanent and permanent installations. Its use permits shifting machinery without re-installing costly permanent



ducts. Illustration shows use of the tube on a grinding machine to remove grinder coolant spray. The tube is self-extending, retractable and noncollapsible. Thermoplastic coated duck fabric is spiral-stitched around a single continuous helical spring core. There is no exposed metal inside or out.

Filing Cabinets: Lyon Metal Products Inc., 716 Clark St., Aurora, Ill.—Filing cabinets with popular and original features are available in 11 models, with or without general locks, in suspension and nonsuspension types. Some characteristics of the cabinets are: Round corner drawer fronts, easy rolling drawers, nonwobble follower blocks, non-rebound drawers and rugged drawer suspension.

Acid Indicator: Fleisher Chemical Co., Benjamin Franklin Station, Washington 4—New titration indicator for determining the concentration of acidity or alkalinity in the laboratory is said to be more accurate and more sensitive than other indicators. It exhibits an emerald green color in alkaline solu-

(*Continued on page* 244)

Important!

EVERY UNITED STATES ELECTRICAL TOOL IS ELECTRICALLY AND MECHANICALLY CORRECT BEFORE LEAVING OUR MODERN FACTORY

And here's more data to show why UNITED STATES ELECTRICAL TOOLS DESERVE AND EARN YOUR CONFIDENCE:

All tools are subjected to a severe running test . . . .

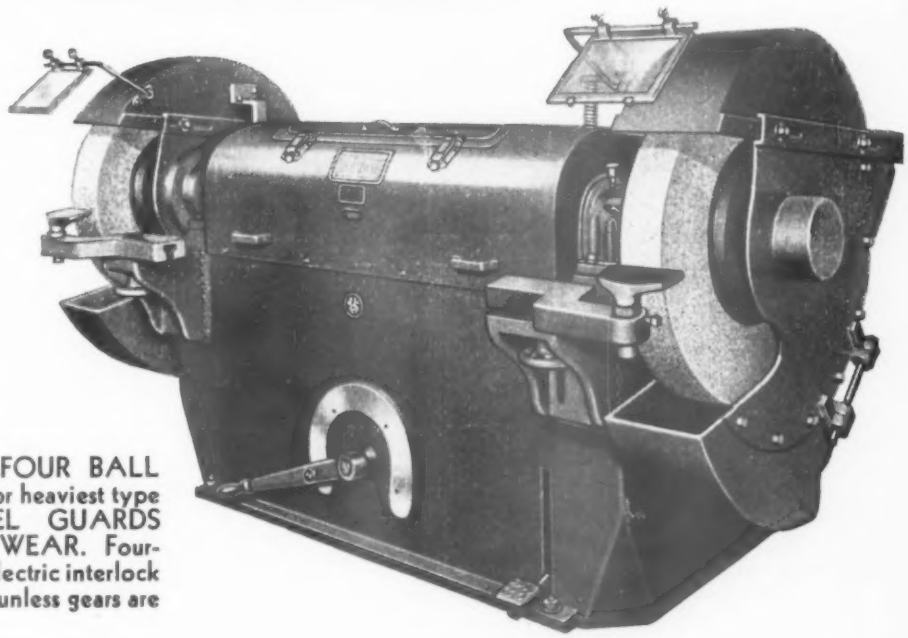
A dialectric test of 1,000 volts, alternating current, 60 cycles is applied between frame and running parts . . . .

All tools will operate satisfactorily on voltages 5% over or under specified voltage . . . .

All tools are guaranteed for material and workmanship.

UNITED STATES ELECTRICAL TOOLS COVER THE ENTIRE INDUSTRIAL FIELD

Contact your DISTRIBUTOR for catalogs, prices and deliveries on Portable Drills . . . Bench and Floor Buffers . . . Bench and Floor Grinders . . . Heat Guns . . . Polishers . . . Sanders . . . Surfacers . . . Flexible Shaft Machines . . . Hole Saws . . . Portable Tappers . . . Valve Seat Grinders . . . Valve Refinishing Shops etc.

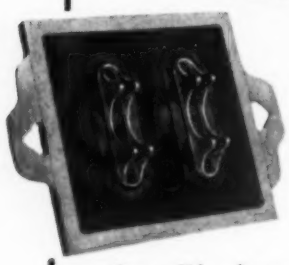


ADJUSTABLE SPEED SNAGGING GRINDER
Model 69

FOUR SPEED CHANGES. FOUR BALL BEARINGS ON SPINDLE. For heaviest type production grinding. WHEEL GUARDS ADJUSTABLE TO WHEEL WEAR. Four-speed gear drive transmission. Electric interlock prevents operation of machine unless gears are in mesh.

The UNITED STATES ELECTRICAL TOOL Co.
CINCINNATI, OHIO

Again TAMASTONE SAVES THE DAY!



Cope Side shows 3" high white metal section set in TAMASTONE due to thin projections plus fact 2 ram-up cores must be used.

Production Increased 600%

★ *Amazing yet true!* . . . because with original loose pattern equipment, the foundry was only able to produce 35 molds—castings per day . . . but, with TAMASTONE, production jumped to 110 molds—220 castings. OVER 600% INCREASE!

Here's how TAMASTONE did the trick . . . a duplicate TAMASTONE pattern was made. These were then used in a 14 x 16 flask. Check photos—see how simple it was to step up production. Write for literature on Foundry Specialties.

Drag Side entirely of TAMASTONE—3½" draw cup pattern.

TAMMS SILICA CO.
228 N. La Salle St., Chicago 1, Ill.

★ Photos courtesy of Efficiency Match Plate Co., Chicago.

Controlled

SEMET-SOLVAY'S coke plants are equipped for quality production. Guesswork is eliminated, resulting in constant uniformity in the finished product. That is why, day in and day out, our foundry coke comes up to specifications—the specifications you have demanded.

SEMET-SOLVAY COMPANY

BUHL BUILDING, Detroit 26, Mich.
GENESEE BUILDING, Buffalo 2, N. Y.
DIXIE TERMINAL BUILDING, Cincinnati 2, Ohio
Canadian Sales Agent: Standard Fuel Co., Ltd., Toronto

Semet-Solvay Foundry Coke

for Better Melting

(*Continued from page 242*)

tion and a purple color in an acid solution. An intermediate gray tint provides a convenient warning of the approaching endpoint. Color changes are sharp and distinct. All titration factors used for other type indicators apply to the new indicator.

Magnetic Tester: Allen B. Du Mont Laboratories Inc., Passaic, N. J.—Known as the Ferrograph, this machine compares ferrous materials as to both their chemical analysis and heat treatment. The instrument, based on the correlation between magnetic properties, particularly remanent magnetism, and metallurgical properties, makes possible the determination of composition and condition of ferro-magnetic materials by magnetic testing, with the cathode-ray tube as the instantaneous indicator. Basic principle of operation is the harmonic analysis of the induced voltage in the secondary of a test transformer in which the sample to be tested is made the core. The complete waveforms can be seen and so need not be estimated, and phase angles can be measured and compared easily. Machine is housed in a steel case 14 x 18 x 24 in., is equipped with two carrying handles and is completely self-contained with its own power pack, operating on 110 v ac. Weight—115 lb.

Flashlight: Ideal Industries Inc., 1922 Park Ave., Sycamore, Ill.—Plastic flashlight case will withstand hard usage. It resists acid corrosion and is unaffected by oils, greases, gasoline or water. Flashlight can be used in rain, mud or salt water, and temperatures from —30 to 150 F will not cause warping, cracking or deterioration. Lens is unbreakable type and will not check or discolor with age. Switch has "on," "off" and signalling positions. Flashlight is prefocused type designed for two 1¼-in. size D dry cells.

Paint: Speco Inc., 3142 Superior Ave., Cleveland—Industrial black paint can be applied directly over rusty surfaces without cleaning or scraping. It is said to seal rusty surfaces and, regardless of submergence in water or exposure in moist or fume laden atmosphere, to prevent further oxidation as well as provide a base for decorative paints.

Conveyor: Rapids-Standard Co. Inc., Grand Rapids 2, Mich.—Gravity conveyor line has 36 in. hinged section for bridging an aisle for passage of personnel, trucks or equipment. It permits breaking a conveyor line as often as desired without disturbing a permanent set-up. Hinged part swings up and back until it rests on

(*Concluded on page 246*)

·HIGH SILICON IRON·
JISCO

JISCO BLAST FURNACE SILVERY

for Better Foundry Operation

From a message by Andrew Jackson to the Congress. "Equality of talents, of education, or of wealth, cannot be produced by human institutions. In the full enjoyment of the gifts of Heaven, and the fruits of superior industry, economy, and virtue, every man is equally entitled to protection by law."

Jisco Silvery Pig Iron is produced in one of the most modern blast furnaces in America. Only virgin ores are used as raw material, thus eliminating unwanted elements which may be present when scrap base is used.

Every drop of Jisco Silvery is filtered through a large volume of molten slag over 3000° F. This removes oxides, sulphur and other undesirable material, at the same time giving up silicon to the iron.

The fact that Jisco Silvery is produced *only* in the *blast* furnace is extremely important to the Foundryman. Jisco is a "must" in today's foundry practice.

Our metallurgical department will be glad to consult with you on any problems you may have.

THE JACKSON IRON & STEEL *Company*
JACKSON, OHIO.

ALUMINUM

FOR PATTERNS, PLATES AND MATCHPLATES

USE

Trade **LECTRO-PAT** Mark

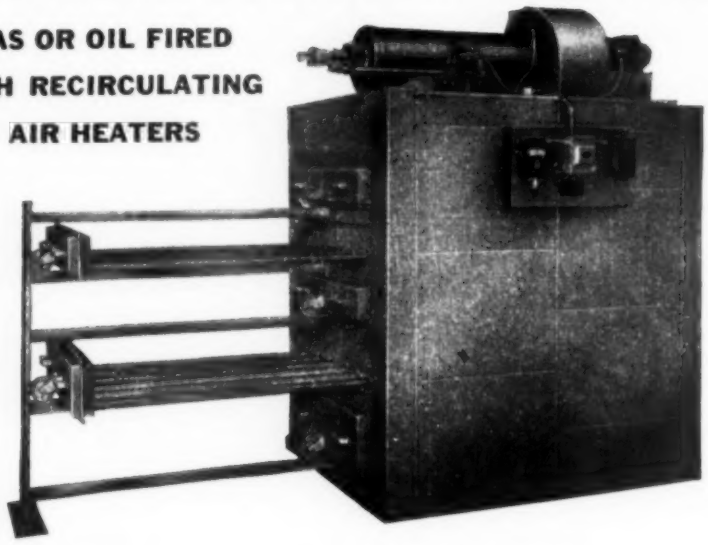
The Aluminum Alloy made especially for these exacting castings.

THE CLEVELAND ELECTRO METALS CO.

CLEVELAND, OHIO

PORBECK DRAWER TYPE OVENS

GAS OR OIL FIRED WITH RECIRCULATING AIR HEATERS



UNIFORM CORES CONTINUOUSLY WITH LOW COST OPERATION

Strictly a *production* unit—note that all drawers operate independently of each other. Comes completely equipped with latest type temperature indicating controls (variable 100° to 650° F) and high efficiency recirculating air heater. Sturdy construction with 4-1/2" fibre-glass insulation throughout. Users commend Porbeck ovens for their space and time saving features. Available in several types and sizes. We invite your inquiry.

WRITE FOR NEW CORE OVEN BULLETIN "F"

PORBECK MANUFACTURING CO.

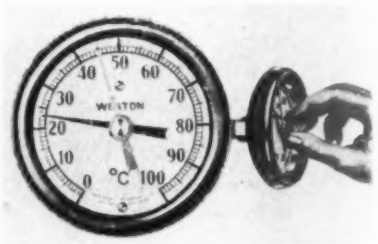
Manufacturers since 1894 of Core Ovens, Mold Dryers, Processing Ovens, Mold Drying Ovens, Heat Treating Ovens, and Paint Baking Ovens.

2600 N. Ninth St. **St. Louis 6, Missouri**

(*Concluded from page* 244)

the stationary section. The 36-in. movable section is attached to an 84-in. stationary section forming a standard 10-ft length of conveyor. The hinge is all steel with no rivets, nuts or bolts to get out of order.

Thermometer: Weston Electrical Instrument Corp., Newark, N. J.—All-metal thermometer indicates the maximum or minimum temperatures reached. To record the lowest temperature reached a red index is manually set by a finger knob which protrudes from the center of the scale glass to the low side of the temperature pointer. Pointer moves the



index to the lowest temperature reached during any operating period, and the index remains at that point until reset. To record the highest temperature the index is set to the high side of the pointer. Thermometer is available in 3 and 5-in. diam scales and in stem lengths from 2½ to 48 in.

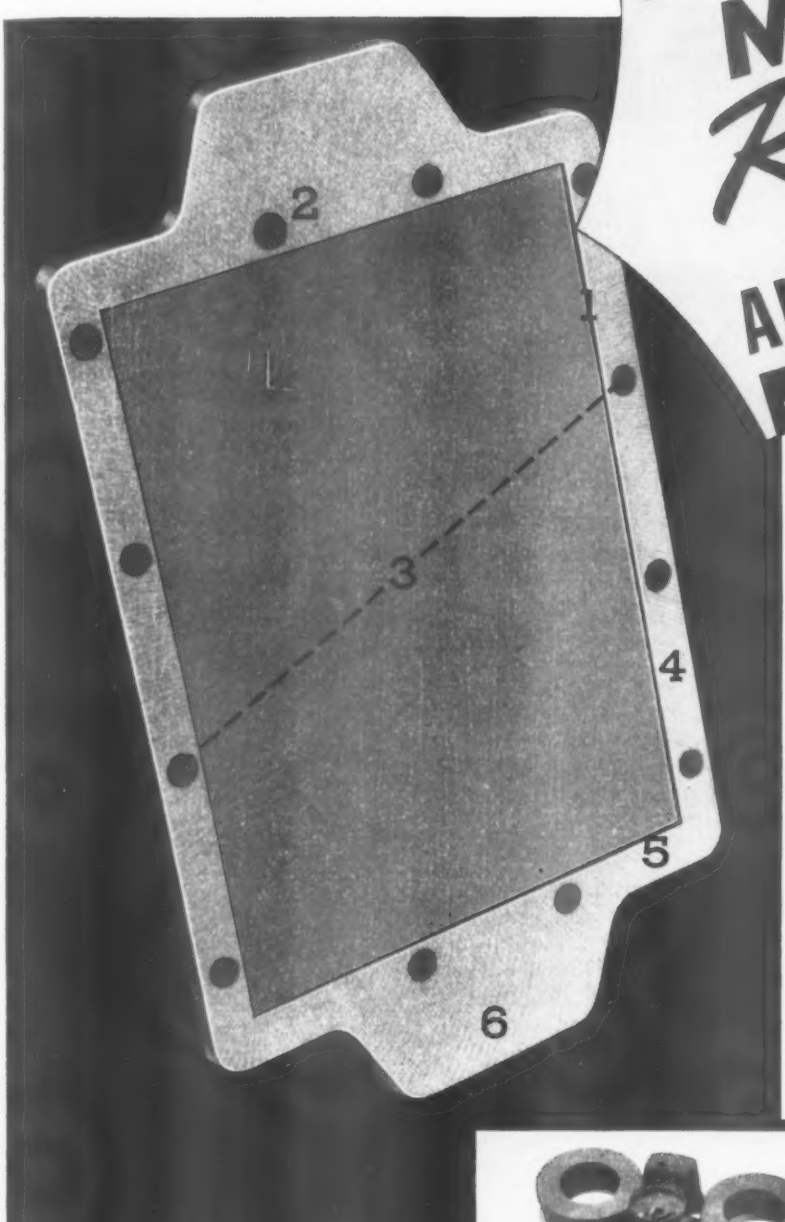
Surface Plate: Gage Division, The DoAll Co., 1301 Washington Ave. South, Minneapolis 4, announces a new surface plate made of a specially alloyed close grain iron. The plate, with a working area 14 x 24 in., is so constructed that system of ribbing gives ample support to working surface. Three feet, positioned to insure a minimum of sagging, are used for support. Working surface is pin-point hand scraped with 22 or more evenly distributed bearing spots per sq in. Maximum deviation of bearing areas from a mean plane is 0.0002-in. over entire surface. Underside of the ¾-in. overhang is machined all around so that work or fixtures can be clamped to the plate. Edge of working surface has also been drilled and tapped on 2-in. centers to mount fixtures.

Crucibles: Electro Refractories & Alloys Corp., 344 Delaware Ave., Buffalo 2—Designed for melting all copper alloys these new crucibles, known as Tercod Conqueror crucibles, are said to have greater density, strength, heat conductivity, flame resistance, thermal flexibility, durability and resistance to metals and slag. It is also claimed that their use effects fuel and time savings.

KINDT-COLLINS

Announces the

MASTER *Recessed* Cast and Ground ALUMINUM PLATE



Here's a *specialized* cast and ground aluminum plate that is ground flat on one side . . . *and has a recessed area 1/32" deep on the other side, permitting the sand to meet and make a perfect joint, thereby largely eliminating finning!*

Here is a complete list of *all* the features of this new MASTER Aluminum Plate:

1. Standard recessed depth is 1/32" with 1" edge all around. Recessed part has cast surface, while 1" edge on which flask rests is smooth ground. Reverse side of plate is specially ground to prevent sand slippage.
2. Tough knurled steel inserts are an integral part of the cast plate—they reduce wear by flask to a minimum—greatly increase plate life.
3. Steel inserts are so placed as to effectively distribute and equalize wear at flask contact points.
4. Ground surfaces are accurately parallel to plus or minus .003" tolerance.
5. One-inch allowance all around for flask strip.
6. Three-inch ears standard—to accommodate all types of flask pin guides. Edges rounded for easy handling.

The new MASTER Recessed Plate will help you get high production of accurate castings with a minimum of plate replacement and delay. And most important of all, it will produce greater profit through greatly eliminating finning, with resultant lower finishing room operations. See actual casting example below!

MASTER Recessed Aluminum Plates with standard 1/32" recessed area and steel inserts are immediately available in the following flask sizes, in one-inch gradations, in thicknesses of 3/8" and 1/2":

10 x 14	11 x 16	12 x 12	13 x 15	14 x 14
10 x 16	11 x 17	12 x 14	13 x 16	14 x 16
10 x 18	11 x 18	12 x 16	13 x 17	14 x 18
10 x 20	11 x 19	12 x 18	13 x 18	
		12 x 20	also 16 x 16	

Plates with recessions less than 1/32" available in quantity lots. At present, sizes other than those listed must be considered special and will be made to order. Other standard sizes will be added later. Write your requirements.

This is an actual unretouched photo of a production ring casting as it came from the flask, produced from a pattern mounted on a MASTER Recessed Aluminum Plate. This job was produced by a prominent mid-west foundry. Note complete absence of fins—no fin-cleaning or grinding costs necessary. Put the MASTER Recessed Plate to work in *your* plant now!

Write for prices on the new MASTER Recessed Plates today. We can also supply the new MASTER Ground Aluminum Tuff-Plate; the regular MASTER Cast Aluminum Plate; and the regular MASTER Cast Aluminum Offset Plates.

KINDT-COLLINS MASTER PRODUCTS

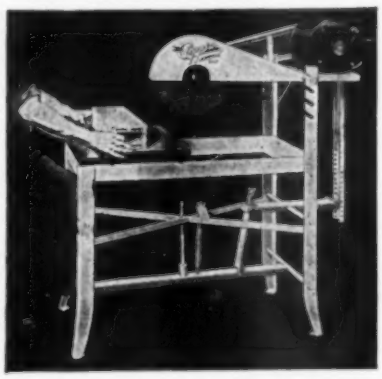
THE KINDT-COLLINS COMPANY

"EVERYTHING FOR THE PATTERN SHOP"

12653 ELMWOOD AVENUE ★ CLEVELAND 11, OHIO

FASTER CUTTING ...with Clipper Masonry Saws

Your Special Size and Shape Brick or Concrete Block can now be "Tailor-Made" at a moment's notice!

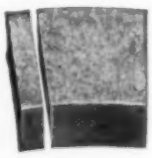


The new Clipper Multiple Cutting Principle makes possible faster cutting of every masonry material regardless of hardness.

Here are a few typical examples of the speed and accuracy with which concrete products and fire brick can be cut.

This concrete block, converted into a special size, was cut completely in two in 19 seconds.

One of the many intricate cuts performed on first quality clay brick for heat treating furnaces — made in 8 sec.



Rotary Kiln Blocks, cut to size for "key" bricks in rotary kilns, require only 10 sec. for completion of cut.

Basic refractories for steel furnaces or cement kilns must be accurately installed. This magnesite brick was cut in 12 seconds!

CLIPPER MFG. COMPANY
4031 Manchester, St. Louis 10, Mo.

AFA Committees For 1946-47 Named

American Foundrymen's Association has announced the appointment of several committees for 1946-47. D. F. Sawtelle, metallurgist, Malleable Iron Fittings Co., Branford, Conn., is chairman and R. H. Jacoby, plant metallurgist, Key Co., East St. Louis, Ill., is co-chairman of the sand shop operation course committee. Other members are: F. S. Brewster, metallurgist, Dowmetal Foundry, Dow Chemical Co., Bay City, Mich.; E. J. Bush, foreman molder, Navy Yard, Washington; F. R. Mason, plant superintendent, Riley Stoker Co.; E. L. Thomas, sand control, Cadillac Motor Car Co., and E. E. Woodliff, sand consulting engineer, Foundry Sand Service Engineering Co., all of Detroit.

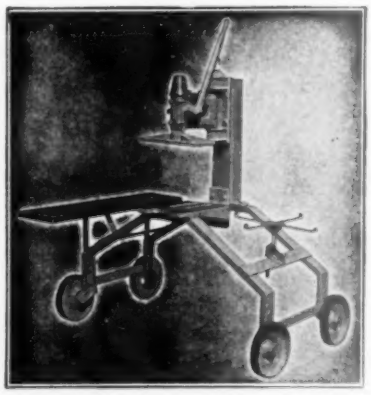
H. C. Stone, metallurgist, Belle City Malleable Iron Co., Racine, Wis., is chairman of the castings inspection committee. F. L. Bender, chief inspector, Chicago Hardware Foundry Co., North Chicago, Ill., is vice chairman and H. R. Youngkrantz, assistant chief metallurgist, Apex Smelting Co., Chicago, is secretary. Other members are: Gustav Dewald, chief inspector, Ampco Metal Inc., Milwaukee; W. H. Gunselman, director of research, Samuel Greenfield Co. Inc., Buffalo; E. G. Leverenz, product engineer, and F. J. Poettgen, chief inspector, cast armor plant, American Steel Foundries, East Chicago, Ind., and R. H. Terry, chief metallurgist, Detroit Diesel Engine Division, General Motors Corp., Detroit.

T. E. Eagan, Cooper-Bessemer Corp., Grove City, Pa., chairman, Gray Iron Division, AFA, has announced appointment of the cupola research committee of that division. R. G. McElwee, manager, iron foundry division, Vanadium Corp. of America, Detroit, will continue as committee chairman, with A. E. Schuh, director of research, U. S. Pipe & Foundry Co., Burlington, N. J., as vice chairman and E. H. Stilwill, chief metallurgist, Dodge Division, Chrysler Corp., Detroit, as secretary. Other members are A. L. Boegehold, chief, metallurgical department, General Motors Research Laboratories, Detroit; H. Bornstein, director of testing and research laboratories, Deere & Co., Moline, Ill., and E. C. Jeter, foundry metallurgist, Ford Motor Co., Dearborn, Mich. Previous committees prepared a complete bibliography of cupola practice and operation and compiled the *Cupola Handbook*, recently published, 470-page reference work dealing with cupola construction, charging and operation. The new committee will outline and recommend cupola research projects.

NEW

"RAPID" HAND SQUEEZER

$122.00



Will handle a lot of your bench jobs and save you money by trebling your production.

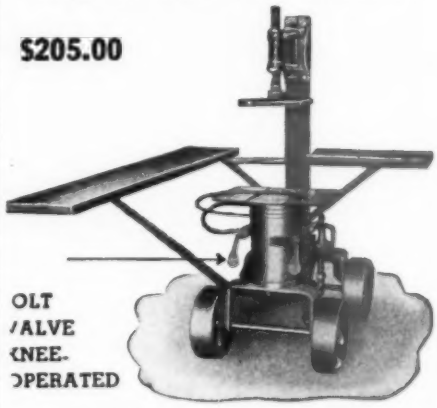
Handles flasks up to 16 x 30 inches. Comes complete with benches. Portable or Stationary Type.

★

"RAPID" R9X JOLT

30% increased jolt capacity

$205.00



A Foundry producer of good molds for over 20 years.

Simple to operate.

Squeeze Plate quickly adjusted. Low initial cost.

★

Write for NEW descriptive folders and Price Lists.

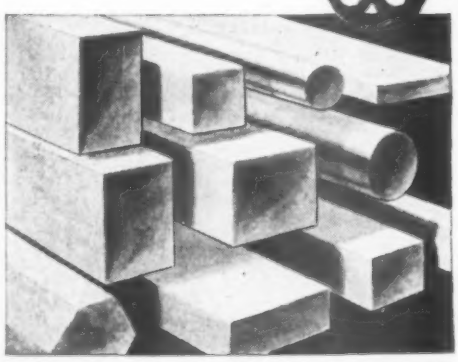
PIONEER MANUFACTURING CO.

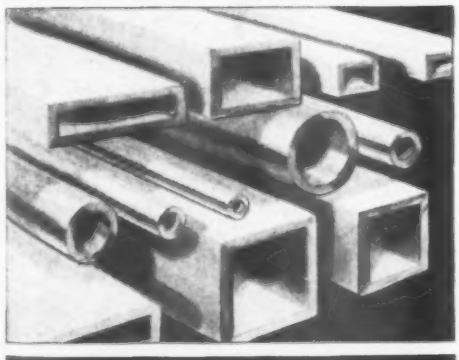
Molding Machine Manufacturer for Over 20 Years

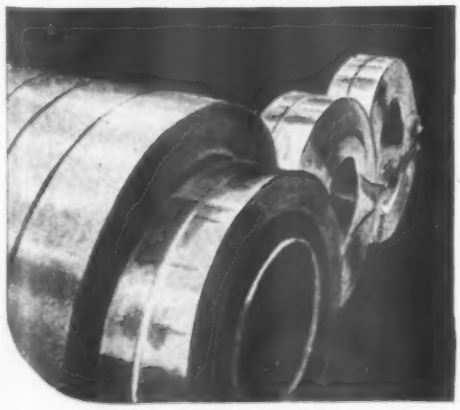
MILWAUKEE (West Allis) WISC.

NOW

Brass Mill Products Quickly!







A large supply of brass mill products is now offered to the trade at unusually low prices. The entire inventory may be fabricated by normal production methods and is being sold in production quantities.

The inventory includes: Free Turning Brass Rod—1 inch diameter and larger; Copper and Brass Tubing—3 inch O.D. and larger; Naval Brass Rod—various diameters; Aluminum Bronze, Manganese Bronze and Silicon Bronze in various shapes.

* * *

This material is offered in the following sequence as provided by law: (1) Certified Veterans of World War II; (2) Subsequent priority claimants; (3) Non-priority purchasers. Federal agencies have had opportunity to fulfill their needs. VETERANS OF WORLD WAR II should apply to their nearest WAA Regional Office for certification; the case number assigned and the location of the certifying office must be stated in a Veteran's offer to purchase.

EXPORTERS: The War Assets Administration solicits your inquiries. Communicate with your foreign clients promptly.

WAR ASSETS ADMINISTRATION

Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Fort Worth • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles

GOVERNMENT OWNED SURPLUS

Louisville • Minneapolis • Nashville • New Orleans • New York • Oklahoma City • Omaha • Philadelphia • Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane

157-8A

• • • By Using a Hoist That Stays On The Job Longer—With Fewer Moving Parts To Maintain!

There are only four moving parts in the hoisting unit of a *Reading* Electric Hoist. To you this means fewer wearing parts—lower replacement costs. And because each of the hoist units can be individually removed for routine inspection or overhauling, maintenance time and expense are kept at a minimum.

Decide today to get fast, low-cost material handling with *Reading* Electric Hoists. Contact your nearest *Reading* Hoist distributor, now. Also, drop us a line for your free copy of "144 Answers To Your Hoisting Problems."

READING CHAIN & BLOCK CORPORATION
2108 ADAMS ST., READING, PA.
CHAIN HOISTS • ELECTRIC HOISTS
OVERHEAD TRAVELING CRANES

READING HOISTS

NEW TRADE PUBLICATIONS . . .

CHAIN HOIST: Reading Chain & Block Corp., Reading, Pa.—36-page illustrated catalog No. 60 describes capacities, lifting speeds, applications and operating efficiencies of various types of chain hoists. In addition to a comparison of chain hoist types, the catalog discusses different methods of hoist installations, and shows the type mounting best suited to specific jobs. Data are given on comparative strength of wooden trusses and steel I-beams for mounting purposes.

PORTABLE PYROMETERS: Wheelco Instruments Co., 847 West Harrison St., Chicago 7—Bulletin D602-4 describes the company's line of portable pyrometers—some with walnut carrying cases. Models for single and double scales are available with or without multiple rotary switches. Specifications for the proper selection of extension holders, adapters and thermocouple tips are listed in chart form.

HARDENING FURNACES: Surface Combustion Corp., Toledo 1, O.—Bulletin No. SC-131 gives a brief resume of hardening practices. Types of furnaces for various methods of hardening and actual furnace installations are shown. These include oven, pot, atmosphere hardening, and isothermal quench furnaces. A table giving Ms points for some steels is included.

MACHINERY PRODUCTS: Ideal Industries Inc., 1296 Park Ave., Sycamore, Ill. — Booklet describes company's pneumatic drill, screw driver, rotary file and die grinder, riveting hammer and pneumatic tool accessories. Dust collector, live centers, balancing ways, metal etching machines, chucks, demagnetizers, surface plate, wheel dresser and electric tachometers are also described.

SCREEN: Robins Conveyors Inc. Passaic, N. J.—Bulletin No. 111-A describes and illustrates the Robins Eliptex screen which employs horizontal, vertical, and elliptical motion in sizing or dewatering materials. Dimensions and clearances in the single, double and triple deck types are clearly stated.

EYE MASK: Standard Safety Equipment Co., 232 West Ontario St., Chicago 10.—Leaflet describes a new all-plastic, noninflammable eye mask weighing 1¾ oz. The goggle fits average facial contours, has pliable plastic head band, replaceable clear or green tinted plastic lenses and may be worn over corrective lenses.

ARC WELDERS: General Electric Co., Schenectady 5, N. Y.—20-page booklet covers the installation, operation, maintenance and overhaul information for type WD-32C, and -33C, -34C and -36C are welding sets. Booklet also contains a trouble-shooting chart and renewal parts and price list.

TIME SWITCHES: Automatic Temperature Control Co. Inc., 34 East Logan St., Philadelphia 44—Bulletin T-55 describes typical installations of time switches—an addition to the ATC line of time controls—to meet special needs of manufacturers of machines and process equipment where emphasis must be placed on a low cost unit and the supply runs into considerable volume.

ELECTRODE: Metal & Thermit Corp., 120 Broadway, New York 5—16-page bulletin describes a new heavy lime base, mineral flux-coated mild steel core electrode designed to prevent underbead cracking in welding high-sulphur free-machining steels, high carbon steels, cold-rolled steels and cast iron. In addition to general descriptive matter, tables give full data on the physical properties, chemical analysis of the new electrode deposit, also information covering the effect of stress relieving and the comparative deposition characteristics of the new rod and other mild steel electrodes.

FLOORING COMPOUND: Walter Maguire Co. Inc., 330 West 42nd St., New York 18—Bulletin No. 602 explains the benefits derived from the use of 100 per cent emery aggregate in the construction of heavy-duty industrial floors. The aggregate, when mixed with cement and water, forms a hard surface known as Emeri-Crete. Better trucking performance resulting in faster movement of goods, greater employee safety and lower handling costs are claimed for the flooring.

PERMANENT MOLDS: Meehanite Metal Corp., 800 Pershing Sq. Bldg., New Rochelle, N. Y.—Bulletin No. 23 describes permanent molds made with Meehanite and used in the production of metals, glass, plastics and rubber. It is claimed that molds made with this material offer a dense, fine-finished surface, improved resistance to surface cracking or alligatoring, the ability to maintain accurate dimensions and good machining qualities.

INSULATION NEWS: Magnesia Insulation Manufacturers Assn., 1317 F St. N. W., Washington—New quarterly publication, *M.I.M.A. News*, for those interested in heat insulation. Publication offers information about heat insulations to industrial users and is a medium of contact between users of 85 per cent Magnesia Insulations and the manufacturers.

ALUMINUM FLUX: Apex Smelting Co., 2537 West Taylor St., Chicago 12—Booklet describes the company's aluminum flux which is said not to smoke or fume, is odorless and does not absorb moisture. A chart gives examples of improvement in mechanical properties by use of the flux. Directions for using the flux are also given.

ABRASIVES HANDBOOK: Norton Co., Worcester 6, Mass.—108-page pocket-size handbook divided into five parts: 1. Abrasives and grinding wheels; 2. Constant, variable and influential factors; grinding examples; reference tables; handling, storage and inspection; general operating rules; grinding hints; 3. Diamond wheels; 4. Available printed matter

and definitions; 5. Grinding wheel recommendation and selection table.

ELECTRICAL CONNECTORS: National Electric Products Corp., Chamber of Commerce Bldg., Pittsburgh—Booklet No. 466 describes and illustrates cut-away models and schematic drawings and presents a factual analysis of the mechanics involved to achieve ample contact area and the permanence of high contact pressure. Known as Gorilla Grip these electrical connectors and terminal units are available for sizes 2000 MCM to No. 2 stranded inclusive.

PRECISION CASTINGS: Allis-Chalmers, Milwaukee 1—Bulletin 19B6451 illustrating various types of precision castings, states that since this casting process is economical only when savings in machining material cost is possible, it is recommended for augmenting other casting and forging techniques. The company uses two methods—the lost wax and plaster molding processes—holding tolerances from .003 in. to .008 in. per in., depending upon form, mass and quantity.

WELD CLEANING: Chicago Mfg. & Distributing Co., 1928 West 46th St., Chicago 9—16-page booklet offers instructions on all phases of weld cleaning. Subjects covered include: Importance of weld cleaning; methods of cleaning arc and gas welds; tests of a clean weld; cleaning before, during and after welding; effect of rust, oil and dirt on welds and cleaning subsequent beads, fillets and grooves.

FLOOR TRUCK: Rapids-Standard Co. Inc., Dept. FT-41, 308 Peoples National Bank Bldg., Grand Rapids 2 Mich.—Bulletin No. TR-NSP-4 contains specifications and illustrations of wood trucks available with steel casters and resinoid, molded-on rubber or steel load wheels—all with roller bearings. Photographs of other Rapids-Standard material handling equipment are shown.

MAGNIFYING GLASSES: Boyer-Campbell Co., 6540 St. Antoine St., Detroit 2—Leaflet describes glasses for use where depth perception (third dimension) and magnification are needed. The glasses are attached by a friction hinge to a fiber headband and may be worn over corrective lenses. They are available in 1¾ diopter, 13 in. focal range and 2½ diopters, 9 in. focal range.

ABRASIVES: Mid-West Abrasive Co., Owosso, Mich.—32-page catalog contains illustrations of coated abrasives, grinding wheels, honing and sharpening stones, and many abrasive specialties. It has complete cross-indexes showing the various sizes, weights, textures and prices.

COMBUSTION DATA SHEETS: Bryant Heater Co., Industrial Division, 1020 London Rd., Cleveland 10—First ten of a series of "Combustioneering" data sheets, prepared for combustion and process engineers, are intended to bring together in a single reference source useful gas combustion and industrial heating data. Mathematical tables, properties of gases, metals and other materials, and

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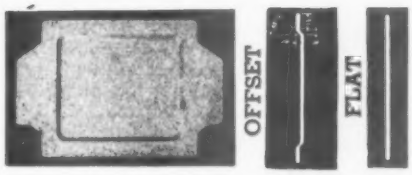

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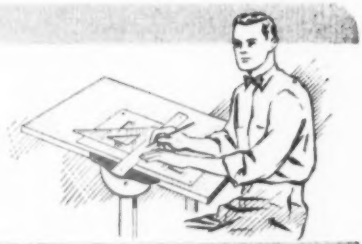

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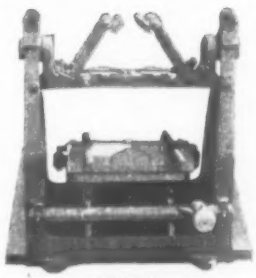

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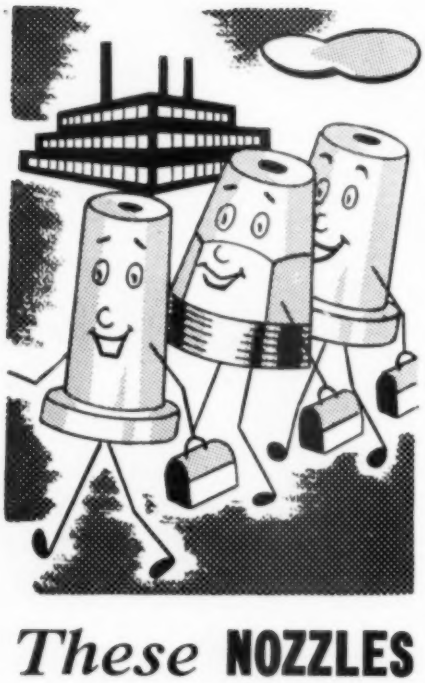

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gas orifice capacity tables are included. Additional material will be added periodically in notebook punched sheets uniform with those now ready.

SODIUM HYDRIDE: Ajax Electric Co. Inc., Frankford Ave. at Delaware Ave., Philadelphia 23—Reprints of the following technical articles which recently appeared in the trade press are offered: "Sodium Hydride Descaling"—describes a steel mill's experience with sodium hydride descaling in salt bath furnaces. "Sodium Hydride Descaling and Desanding of Ferrous Castings and Forgings"—deals with special application of sodium hydride process to iron castings and forgings.

MOTORS: Crocker-Wheeler Electric Mfg. Co., Division of Joshua Hendy Iron Works, Ampere, N. J.—Bulletin SL-300-3 describes round frame, protected-type electric motors for close coupling to centrifugal pumps, agitators, atomizers and many types of machine tools. Motors are available for flange or face mounting in frame sizes up to 326. Both types are furnished for horizontal or vertical operation and are protected against dripping liquids or falling particles.

FIRE PROTECTION: Randolph Laboratories, 8 East Kinzie St., Chicago 11—Catalog No. R-5827, "How to Fight Fires and Protect Property," graphically explains and illustrates the latest techniques in fighting fires with carbon dioxide and other type fire extinguishers. It indicates fire hazards, how to mobilize employee fire defense and the approved methods of operation for carbon dioxide, soda-acid, foam, pump tank and carbon tetrachloride extinguishers.

MICROMETERS: George Scherr Co., 200 Lafayette St., New York 12—Folder describes the manufacturing methods and inspection procedures such as checking parallelism and flatness of spindle end and anvil. The company's line of micrometers includes outside models in sizes 0 to 6 in., inside and depth micrometers, and sets of micrometers in both English reading and metric types. The 1, 2 and 3 in. sizes are provided with a ten thousandths in. vernier.

ELECTRODES: Hollup Corp. 4700 West Nineteenth St., Chicago 50—64-page catalog of electrodes and oxy-acetylene gas welding rods includes descriptions, color identification, specifications, welding procedures, recommended ranges and sizes available. There are tables on the weldability of metals, appearance inspection of welds, electrode consumption estimating chart and definitions of welding terms.

HYDRAULIC EQUIPMENT: Hydro-Power Inc., Springfield, O.—Bulletin No. 460 contains information and basic specifications on the company's line of hydraulic high pressure pumps, valves, controls, boosters and packaged hydraulic power units.

MARKING TOOL: M. E. Cunningham Co., 97 East Carson St., Pittsburgh—Bulletin describes metal marking kit which includes steel type and holding tool packaged in a sectionalized wooden box. Nine sizes—1/32 to ¼ in.—of type are available and each holder will hold all nine sizes. Holders come with ½ to 1½ in. type recess and will hold 2 to 48 characters depending upon type size.

METAL FLASKS: Black, Sivalls & Bryson Inc., 7500 East Twelfth St., Kansas City, Mo.—Catalog No. 18 contains descriptions and sizes of company's made-to-order welded black steel or hot dipped galvanized flasks, upsets, bottom boards, squeeze plates, core plates, flask pins and bushings. Information on how to order and the care and maintenance of steel flasks is given.

ELECTRIC MOTORS: Century Electric Co., St. Louis 3—Booklet illustrates company's slip ring induction polyphase motors and outlines operating characteristics. These motors are offered for use where high starting torque and low starting current are required in bringing heavy loads up to speed, for adjustable varying speed applications and for reversing operations.

ELECTRODE CHART: Eutectic Welding Alloys Corp., 40 Worth St., New York 13—Chart gives suggested applications, properties of welds and procedure information for the company's "low temperature" welding rods. Typical information given consists of the bonding and remelting temperature for each alloy, brinell hardness and strength.

BLOWERS: Allis-Chalmers Mfg. Co., 677, Milwaukee 1—Booklet describes turbo-blowers, rotary compressors and vacuum pumps, how they operate and how to figure them. Curves are included, showing pressure volume, influence of water vapor on volume and corection curves for volumes to maintain constant air weight with changes in temperature and barometric pressure.

ELECTRODE: Ampco Metals Inc., 1745 South 38th St., Milwaukee 4, has issued bulletin No. W-9 describing its new AC-DC shielded-arc bronze electrodes which use the short arc technique of coated steel. Bulletin contains a table of physical properties, lists typical applications and gives detailed welding procedures for the new rod.

METAL COATING: American Chemical Paint Co., Ambler, Pa.—Folder describes company's ferrous metal coating known as Thermoil-Granodine which produces a dense, phosphate coating suitable as a base for paint, and when oiled minimizes the effects of friction and retards corrosion and rust.

LEATHER PACKINGS: Alexander Bros., 406 North Third St., Philadelphia 23—Booklet presents latest information on leather packings. It contains tables, drawings, engineering data, and explanations of common sense methods to assist in the proper design, application and maintenance of packings.

MASONRY BLADES: Clipper Mfg. Co., 2800 Warwick, Kansas City 8, Mo.—Bulletin No. 70 describes Clipper blade for cutting brick, tile, refractories, stone, etc. Information is given on material densities and the cutting of glazed tile, chrome and magnesite, and concrete with different aggregate.

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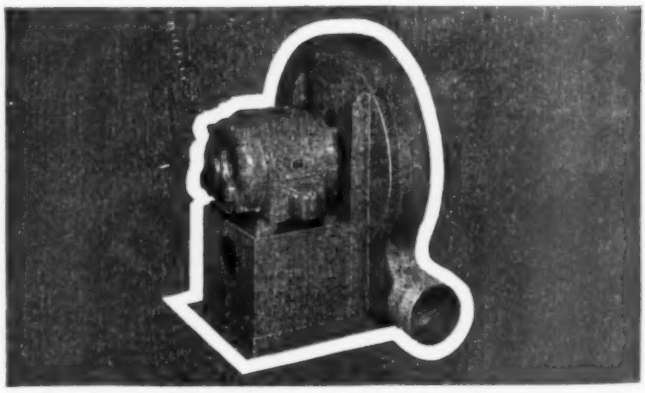

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1. Fill castings with sealing solution.
2. Close all openings.
3. Heat in oven for 1 hour at 250° F.
4. Cool. Drain out excess solution and allow to stand at room temperature for 2 hours.
5. Bake castings for 1 hour at 300° F. Allow to cool before testing. Caution: Do not heat beyond tensile strength of casting; at 250° F. will produce approximately 150 psi.

METHOD B

1. Preheat castings in oven for ½ to 1 hour at 150-180° F.
2. Fill with sealing solution.
3. Apply air pressure of 70-100 psi for ½ hour.
4. Cool. Drain out excess solution and allow to air-dry for 2 hours.
5. Bake castings for 1 hour at 300° F. Allow to cool before testing.

METHOD C

1. Place castings in vacuum drum filled with sealing solution. Close tightly.
2. Evacuate the drum to vacuum of 23-28 inches.
3. Maintain vacuum for ½ to 1 hour
4. Open valves, remove castings. Wipe excess solution from castings.
5. Allow to air-dry for 2 hours.
6. Bake castings for 1 hour at 300° F. Allow castings to cool before testing.

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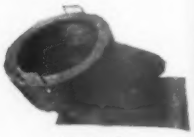

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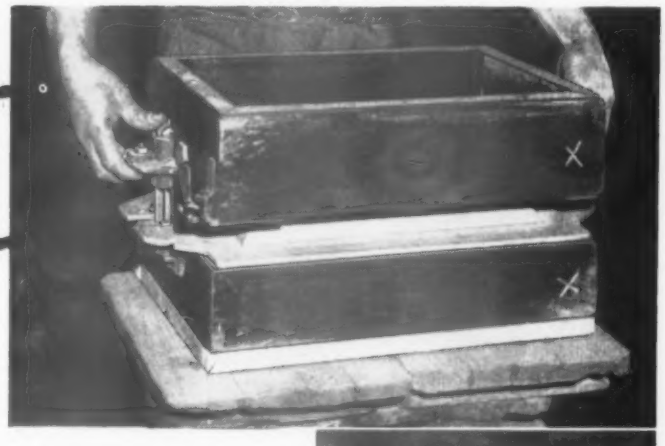

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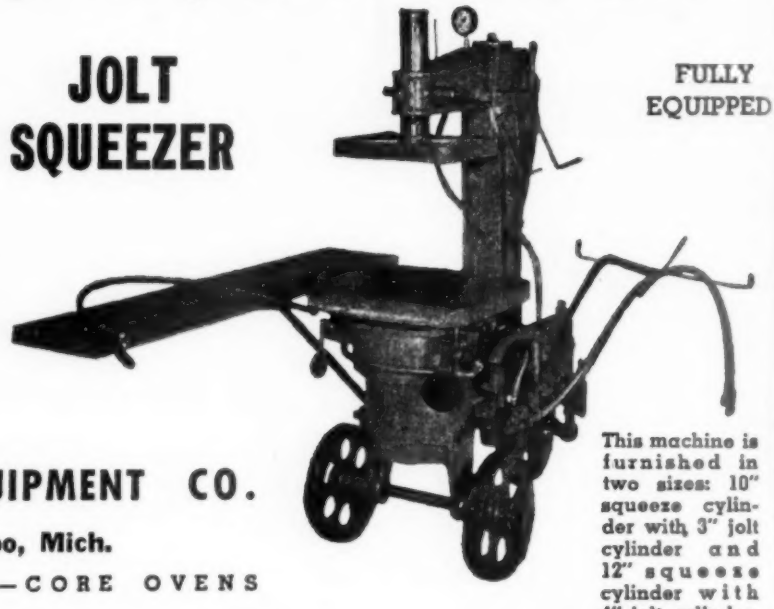

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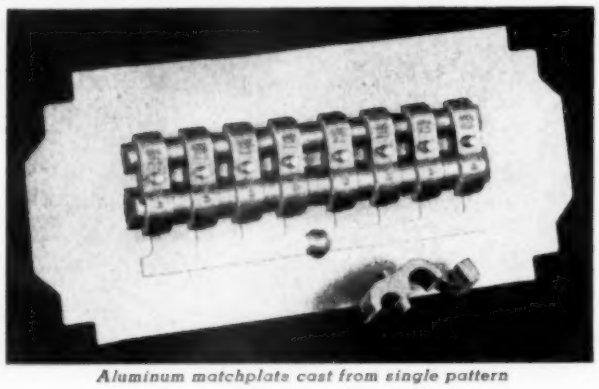

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A pair of variable speed sheaves are linked with the wheel guard adjustment in such manner that spindle speeds are automatically changed to maintain constant cutting speed when guards are reset to follow the wheel wear. This machine may also be equipped as a Multi-Speed Grinder, thus giving a choice of three speed changes.

These machines are made for wheel sizes ranging from 20" to 30" diameters and up to 4" widths, driven through multiple strand V belts from 20 HP to 40 HP motors.

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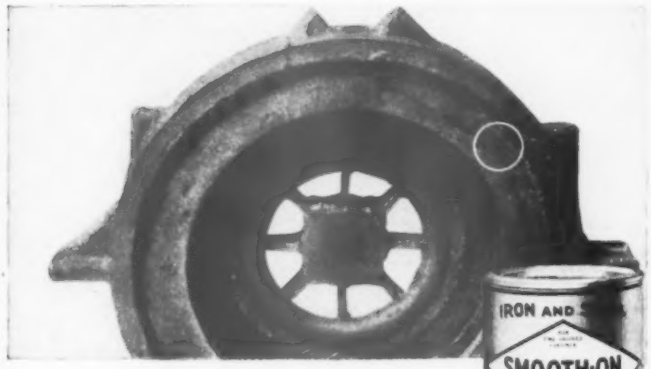
● If dirt, dust, shavings or other useless or harmful particles are created in your manufacturing process, a Goergen-Mackwirth Cyclone Separator will remove and segregate them efficiently and economically. The complete range of sizes available in Cyclone Separators makes it easy to select the exact size for your requirements. Special types and sizes can be designed for individual needs.

Goergen-Mackwirth Cyclone Separators require less horsepower for the fan operation because their offset outlet and clockwise rotation within the collector body greatly reduce the resistance loss through the collector. Their design eliminates the back-pressure found in ordinary separators.

Ask to have one of our engineers survey your problem and submit recommendations. Or write telling us what you want to do and we will quote on the separator needed to do the job.

Goergen-Mackwirth
COMPANY, INC.
817 SYCAMORE STREET, BUFFALO 12, N. Y., Phone: Cleveland 6661
SPECIALISTS IN THE MOVEMENT AND CONTROL OF AIR



How wise foundries
REDUCE REJECTIONS

WHEN an internally sound casting is rejected unjustly, because of a few unsightly but harmless surface blemishes—that's a headache. Avert such headaches—as experienced foundrymen the country over avert them—by using Smooth-On No. 4 Foundry Cement.

Use it to fill in sand holes, blow holes, pock marks. Use it to true up dented contours and other surface irregularities that are actually harmless—yet look bad. With Smooth-On No. 4 you can match color and texture and provide a surface that will take filing and machining and will last for the life of the casting.

CHOOSE THE RIGHT SHADE

Use Smooth-On No. 4AA for light gray castings. Has fine grain, high lustre. Machines well. 1-, 10- and 50-lb. sizes.

For medium gray castings use Smooth-On No. 4A. Close grain, good lustre. 1-, 5-, 25- and 100-lb. sizes.

For dark gray castings use Smooth-On No. 4B. Coarser grain, deeper color. 1-, 5-, 25- and 100-lb. sizes.

Try Smooth-On FREE

To any foundry that is not familiar with Smooth-On No. 4 Foundry Cement, we will send, without charge or obligation, enough Smooth-On to make a practical test. Check the grade you want to try and mail the coupon. We'll send you also hardened specimens of Smooth-On, showing color and texture, and the famous 40-page, pocket size Smooth-On Handbook, showing time-saving, money-saving uses for the various Smooth-On Cements.

Check and Mail NOW

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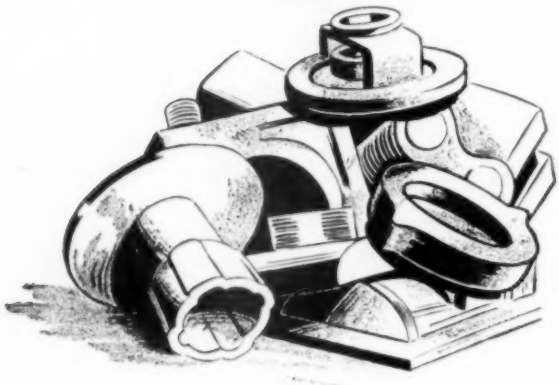
570 Communipaw Ave., Jersey City 4, N. J.
Please send me working samples of Smooth-On
No. 4AA ☐ No. 4A ☐ No. 4B ☐
Name .....
Address .....
11-46 .....

Do it with SMOOTH-ON

Who is responsible for core blowing losses



REGARDLESS of who may be responsible, the fact is core blowing is costly both in scrap castings and in time and labor losses. That's why every foundry having such losses will be interested in eliminating them. Especially when in most cases they can do this quickly and at low cost with Buffalo Brand Vent Wax.

Yes, Buffalo Brand Vent Wax provides adequate clean vents in any core to allow the escape of gases when the molten metal is poured into the mold. That's why leading foundries coast to coast rely on Buffalo Brand Vent Wax to prevent core blowing. There is a *right* Buffalo Brand Vent Wax for every purpose. Write today for free sample.

VENT WAX

Buffalo Brand
VENT WAX

UNITED COMPOUND COMPANY
328 South Park Ave. Buffalo 4, N. Y.

The
E. & G. BROOKE IRON COMPANY
BIRDSBORO, PENNSYLVANIA

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Manufacturers of
BASIC, MALLEABLE, FOUNDRY
FORGE AND LOW PHOSPHORUS

PIG IRON

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Established 1788

BY
BEST TEST
HI-GRADE Steel

SHOT AND GRIT

For Toughest Blast Cleaning and Surface Peening Operations

SHOT—

- Controlled screening and grading.
- Withstands repeated strain, stress and wear in blasting equipment.
- ITS TENSILE STRENGTH AND TOUGHNESS IS ESPECIALLY ADAPTABLE FOR PEENING.
- Uniform roundness of shot. Pellets are fully utilized on impact.
- Lack of irregular shapes and hollows results in highest efficiency.
- Free from dust and other residue.
- Slowness in wearing down produces longer life and maximum usage.
- Its secret alloying and tempering process prevents rusting and reduces impact fractures.

GRIT

High-Grade Grit is thicker, sturdier, tougher. Except onal abrasive qualities. Its construction gives longer usage. Definitely reduces operating costs.

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MANUFACTURERS
CLAYTON SHERMAN ABRASIVES COMPANY
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MELTING POTS—Ingot Molds

for ALUMINUM AND OTHER NONFERROUS METALS. 45 SIZES.

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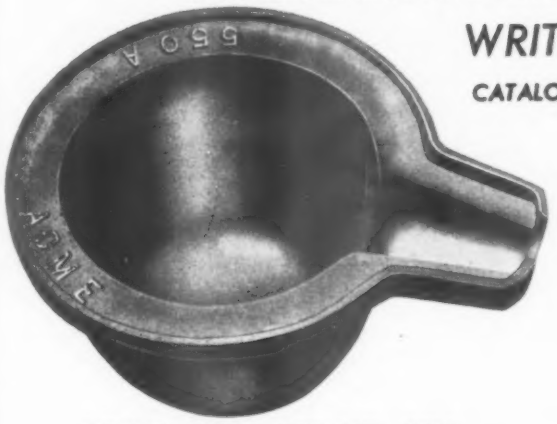
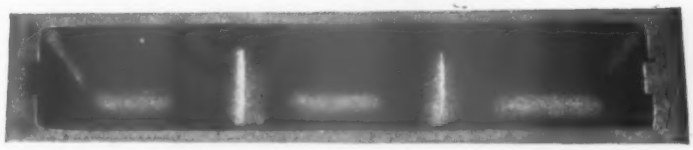


ROUND SPOUT POT NO. 550A
WITH 1⅛" COLLAR ON FLANGE

HOLDING BOWL NO. HP7001



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Made of Acme SPECIAL-M-Heat Resisting Iron — They Stand the Heat!

ACME FOUNDRY COMPANY

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LADLES

for Handling and Pouring

ALL METALS

TIMKEN-WORM GEARED LADLES

These patented ladles are designed by men with over 30 years of practical foundry experience.

They offer the utmost in Safety, Dependability, Long Life, Ease of Operation, Convenience, Economy and Simplicity.

They are manufactured in all types and sizes, and are arranged for manual or electrical operation.

Our line of pouring and handling equipment is complete, including bowls, shanks, bails and tongs . . . special equipment.

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LIKE SAND IN YOUR OIL

MOISTURE IN COMPRESSED AIR MEANS

RUIN

Moisture, oil and scale, carried into expensive, air-actuated tools via the compressed air lines, bring ruin as thoroughly and as quickly as does sand in your oil. • Eliminate moisture, oil and scale from compressed air lines the **Murphy** way, the **guaranteed** way. Our extensive line of aftercoolers, separators and automatic ejection traps contains a unit that will exactly meet your need regardless of the volume of air to be processed. And every unit of recommended **Murphy** equipment, when installed according to directions, carries an **unconditional guarantee to completely solve your problem or money refunded.**

WRITE FOR LITERATURE

Please give approximate size of your compressed air system or storage tank, and outline briefly the condition to be overcome.

ADDRESS DEPARTMENT A-18

GUARANTEED COMPRESSED AIR PRODUCTS

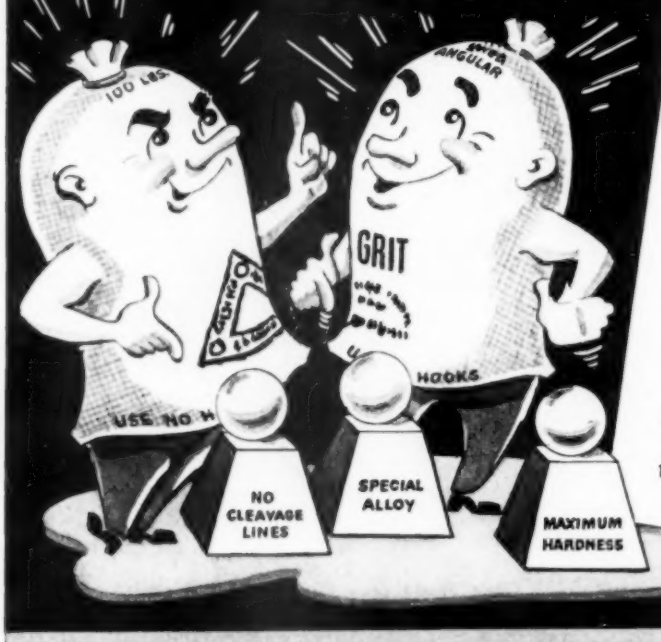
AFTERCOOLERS • SEPARATORS • STRAINERS • TRAPS
SPRAY GUNS • PISTOL SPRAYERS

JAS. A. MURPHY & CO.

HAMILTON, OHIO, U.S.A.

Moisture Elimination Up To 3000 Pounds Per Square Inch

MORE DURABLE . . .



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It costs you less and you get better blast-cleaning results when you use CERTIFIED Angular Grit and Samson Shot. Three special manufacturing processes help produce abrasives that are non-shattering, dust-free —

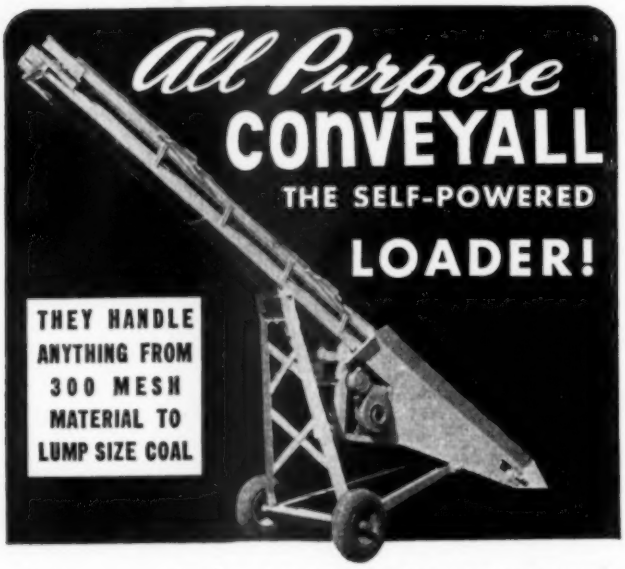
1. An exclusive process makes each grain a complete homogeneous mass, with no cleavage lines. 2. A special, costly alloy (restricted during the war) increases the virgin metal's hardness. 3. Automatically-controlled heat treatment and tempering develop maximum hardness.

All sizes graded to new S. A. E. specifications. Specify CERTIFIED.

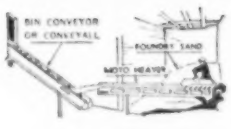
Pittsburgh Crushed Steel Co.
PITTSBURGH, PENNA.

Steel Shot and Grit Co.
BOSTON, MASS.

All Purpose CONVEYALL
THE SELF-POWERED
LOADER!



THEY HANDLE ANYTHING FROM 300 MESH MATERIAL TO LUMP SIZE COAL



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The new CONVEYALL standard model shown above can load sand into bins at variable heights up to 10 feet and possesses a scoop arrangement that requires no "shovel-feeding". It is a new innovation in the field of bin loading and possesses many unusual features. Special sizes and lengths can also be constructed. Write for prices and capacity ranges.

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By Pat Dwyer

A COMPLETE encyclopedia, a ready reference and a practical guide to sound foundry practice. In addition to a description of every conceivable type of gate and riser, the text covers the application and function of gates and risers to all sizes and types of castings. Illustrations on almost every page enable the reader to grasp the salient points with a minimum of study.

363 pages
244 illustrations

Indexed for ready reference

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ALL DIRECTIONAL
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• QUIET
• POWERFUL
• LONG LIFE

ASK YOUR FOUNDRY SUPPLY HOUSE

MANUFACTURED BY
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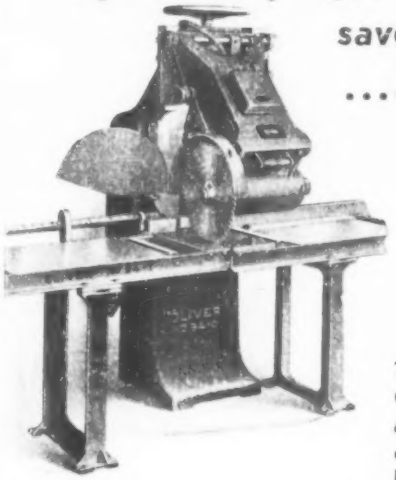
"Oliver" Cut-Off Saw
Operates by light touch . . .
saves space
. . . accurate to
.005 inch



The "Oliver" Cut-Off Saw gives you accurate, straight line operation — insured by the suspended link motion. Makes straight or angle cuts with saw or cut-off wheel. Saw returns to original locked position automatically with no rebound. Has highspeed precision ball bearings for smooth operation, long life and low maintenance costs.

Write for Bulletin 94-D

OLIVER MACHINERY COMPANY
GRAND RAPIDS 2, MICHIGAN

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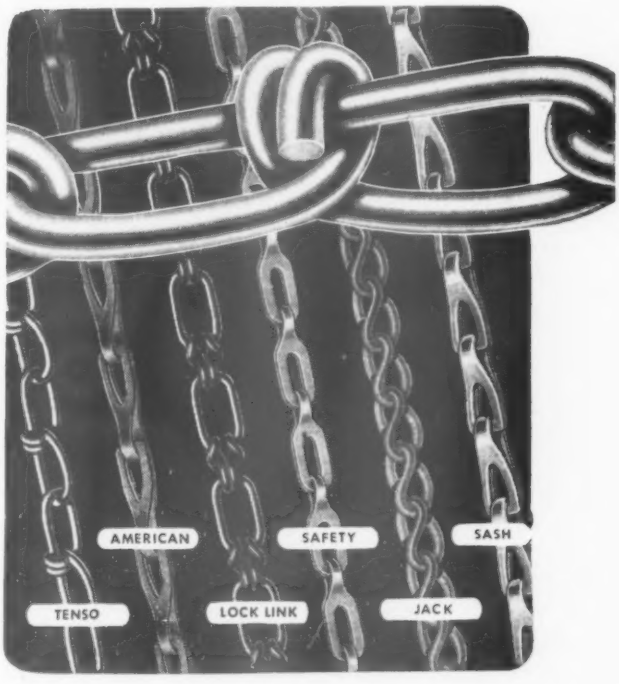
Answers Another
Chain Question . . .

QUESTION:
HOW IS STRONG CHAIN MADE WITHOUT WELDS?

AMERICAN Weldless Chains are made by automatic processes that insure strength. Most wire type weldless chains are made by forming a secure knot in a length of wire. Flat link chain (American, Safety, Sash, etc.) is made by stamping blanks from strip stock, folding and inserting them to form a continuous chain.

Shown here are some of the more popular patterns of AMERICAN Weldless Chain. These and other weldless chains are made by AMERICAN in a wide range of sizes and a selection of finishes.



★ ★ ★ BUY AMERICAN
the COMPLETE Chain Line

American Chain Division makes all types of electric welded and fire welded chain – all types of weldless chain made of formed wire or stampings – a complete line of chain fittings, attachments and assemblies – repair links – cotter pins – hooks.

ACCO York, Pa., Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco Bridgeport, Conn.

AMERICAN CHAIN DIVISION
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TRADE MARK

In Business for Your Safety

Again and Again ... They Come Back for THE MOTORIZED HydroLectric

Famous firms continue to re-order HYDROLectric Lift Trucks for one basic reason:
They find HYDROLectrics superior, in performance and economy, to any other motorized lift truck.
They know they can depend on every HYDROLectric to do the work ordinarily requiring 3 or 4 men. Move bigger loads with effortless ease.
Speed up handling amazingly . . . . Operate 24 hours a day, with absolute safety and negligible downtime. Afford sensational economies — cut handling costs as much as 75% —quickly pay for themselves several times yearly.

Write today for folder F for details about this remarkable motorized truck.

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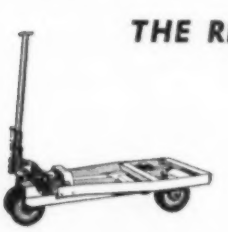
NO OTHER TRUCK HAS ALL THESE FEATURES:

- Positive gear drive to load wheel.
- 4 wheels for stability.
- Costs only 1/3 and weighs only 1/3 of other powered trucks of equal capacity.
- Records up to 21 years of 8 hour-day performance.

THE RED ARROW
THE HYDROMATIC



Easy single or multi-stroke hand lift trucks. Capacities up to 8000 lbs. Users state they pay for themselves 5 to 10 times yearly.

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JOHNSON AFTERCOOLER
Used where moisture is vaporized by the heat of compression. Circulates cooling water around the line, condenses the oil and water vapor so Separator can remove them. Simple in design, highly efficient in performance.

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- Have you some used equipment which should be turned into cash?
- Are you seeking a job?

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THE FOUNDRY
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Perfect Teamwork

for better blast cleaning

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Every pellet does its job when you use GLOBE "H-C" CHILLED SHOT AND GLOBE CORNERED GRIT • Special manufacturing processes insure uniformity in size and hardness — so you can depend on maximum precision cleaning and longest service life • Specify "GLOBE" — and benefit from the extra values resulting from 37 years of metallurgical experience. All sizes graded to the new S.A.E. specification.

GLOBE STEEL ABRASIVE CO.

MANSFIELD, OHIO

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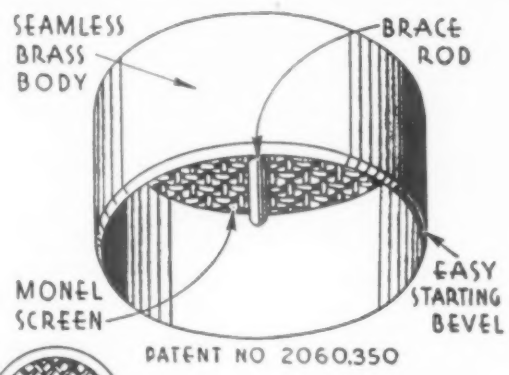
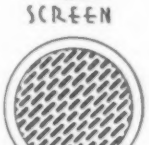


SCREEN



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SAND PACKS AROUND THIS CHAPLET.. Sounder

Cleveland

COIL HEAD RADIATOR CHAPLET

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Leading foundries producing Automotive, Stove and Similar Castings are enthusiastic over result of switching to this chaplet. Cores are held more firmly, thus reducing casting rejects and make-over labor cost.

We also make a Square Head type of Radiator Chaplet, and Stem and Double Head Chaplets for heavier work.

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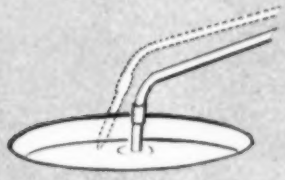
W. 67th St. & N. Y. C. Ry.

CLEVELAND, OHIO

CLEVELAND Since 1890 Chaplets

Couple wires are completely enclosed with refractory insulators.



These Thermocouples stand repeated immersions, due to the enclosed tip.

"Know Your Pouring Temperatures!"

"We pour our metal as cold as we can and still 'run the castings'. The higher the pouring temperature, the more the metal has to shrink. Your Marshall Thermocouples enable us to safeguard this minimum shrinkage". — A mid-western foundryman. (Name on request).

Foundrymen everywhere, like the above, are improving the quality of their castings by maintaining closer control of pouring temperatures. They are using Marshall Enclosed-Tip Thermocouples. They find these instruments built to give quick temperature reports, and their readings can be relied upon. Guesswork is eliminated because you know just how hot your metals are.

Marshall Thermocouples stand many immersions, without failure. Use them in measuring temperatures of molten brass, bronze, copper, aluminum and magnesium. Their use assures castings that will pass all tests. They reduce scrap losses. They are in use at nearly all nonferrous foundries in this country and Canada.

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MARSHALL
THERMOCOUPLES

BESSEMER FERRO-SILICONS

GLOBE IRON COMPANY

THE PIONEERS OF SILVERY IRON

SPECIAL HIGH SILICON GRADES

YOU CAN'T THINK OF SILVERY IRON WITHOUT THINKING of GLOBE

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INCREASE YOUR OUTPUT AND REDUCE UNIT COSTS

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SINGLE LINE
Special Type for
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3/8 to 2 cu. yd. cap.
Send for descriptive bulletin.
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The "UNIVERSAL" Binder . . .

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CORE OIL

NOW MADE AND SOLD BY

Quandt Core Oil is a unique binder that can help you cut baking time and fuel cost 30% to 60%. It is unusually free from gas, smoke, or fumes; may be used safely with finest grain sand; does not creep or migrate; assures sound, true castings of uniformly excellent finish.

Descriptive Bulletin 453 on Quandt Core Oil and Quandt Core and Mold Wash will be sent upon request.

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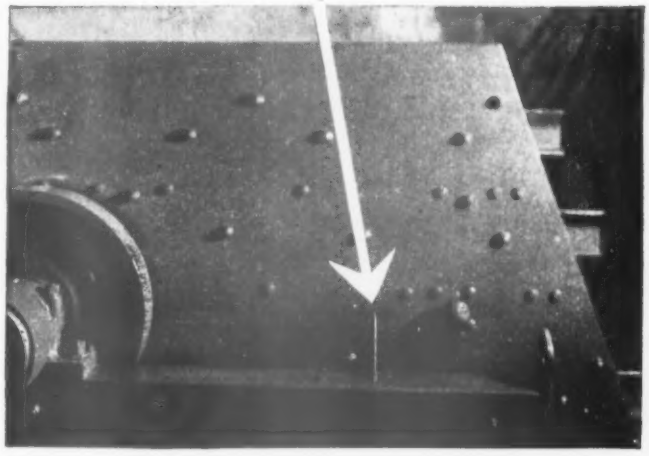
Built anywhere, any size and by trained traveling crews. Covered by guarantee.

• 1946 Foundry Bin Catalog Ready

THE NEFF & FRY CO.
Camden, Ohio

NEFF & FRY SAND BINS

HERE'S GRAPHIC PROOF! of SECO'S Engineered Balance



All of the Vibration is in the Screen

This is an actual untouched photo of a 3½ deck Seco vibrating screen operating at 1050 R.P.M. Note that the pencil and washer standing upright on the base frame are unshaken. The vibration is where it belongs—in the live body. Note also, if you have a magnifying glass, that the little white spots on the side plates show up as true circles, even at the most extreme end of the screen. Thus, not only does Seco keep all the vibration in the live body but also keeps all the vibration under controlled true circular motion. This is engineered balance, the kind of balance that pays off by doing a more thorough job of screening with less attention and less wear and tear on other moving parts. No wonder users everywhere report such impressive performance records with Seco Vibrating Screens.

There is a right Seco for your screening needs. Write Dept. G today!

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9 Lafayette Avenue, Buffalo 13, N. Y.

FOR TOP PRODUCTION
OF CASTINGS AND INGOTS

choose

Heroult

ELECTRIC

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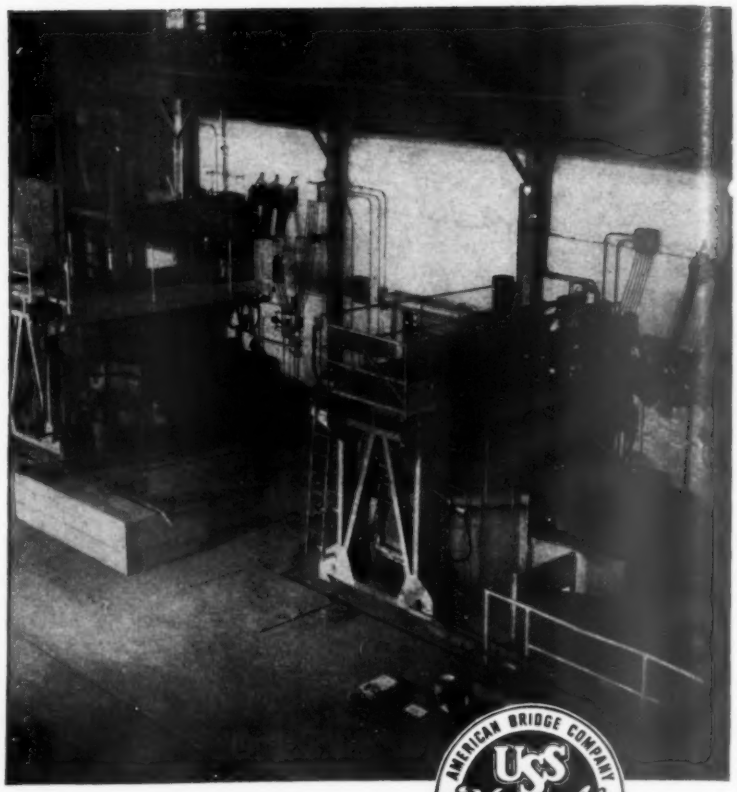
Top charging

Effective gantry design combined with platform attached to furnace for minimum maintenance and maximum efficiency of operation.



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General Offices: Frick Building, Pittsburgh, Pa.

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UNITED STATES STEEL

Fastest possible dressing action on snagging wheels and other large or coarse wheels calls for Desmond Huntington dressers. Five types of handles and three sizes of cutters meet the full range of requirements. Write for the complete Desmond Catalog No. 45F.

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Desmond

the only complete line of grinding wheel

DRESSERS & CUTTERS

BALL BEARING DRESSERS · REVOLVING CUTTER TYPE DRESSERS · DIAMOND HAND TOOLS AND NIBS · WHEEL TYPE DRESSERS · SIMPLEX STEEL-SLIDE VISES

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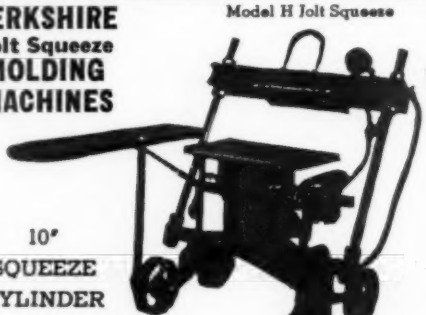
Jolt Squeeze
MOLDING MACHINES

Model H Jolt Squeeze



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10" SQUEEZE CYLINDER

4" JOLT CYLINDER

CANNON VIBRATOR CO. • 1111 Power Ave. Cleveland, Ohio • **BERKSHIRE MFG. CO.**

Order your own

FREE "COMMAND PERFORMANCE" of FOSECO FEEDOL!

The non-ferrous alloy Feeding Compound.

1. It acts automatically!
2. Retains metal in liquid state longer!
3. Assists in directional solidification!
4. Allows reduction in height and volume of feeding heads or risers!
5. Eliminates necessity of making and baking inserts.

Let FOSECO FEEDOL act for you!
Send for a free sample . . . Make your own test.

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NEW YORK 16, N. Y.

HELPFUL LITERATURE

NOTE TO READERS: If you will check the item or items described which particularly interest you, we will be glad to request the manufacturers concerned to send you their literature. Use the attached postal card

1. Aluminum Alloy Flux

Apex Smelting Co.—4-page illustrated folder "Apex Flux" cites use of Apex aluminum flux to produce homogeneously sound metal. Castings produced from such metal have good physical and mechanical properties and are easy to machine.

2. Lift Trucks

Ross Carrier Co.—8-page illustrated catalog "Heavy Duty Lift Trucks for Industry's Big Jobs" describes models 19, 18, 16, 15 and 12 HT high capacity trucks. Specifications for each model and operational information are charted for reference.

3. Machinery Products

Ideal Industries, Inc.—24-page illustrated catalog "Ideal Machinery Products" gives characteristics and specifications on company's line of pneumatic drills, etching units, pneumatic screwdrivers, rotary files and die grinders, pneumatic riveting hammers and tool accessories.

4. Arc Welders

General Electric Co.—20-page illustrated catalog No. GEH-1334 describes eleven models of direct current arc welders. All models are either motor or belt driven. Instructions, parts lists and maintenance and overhaul information are given.

5. Portable Pyrometers

Wheelco Instruments Co. — 4-page illustrated bulletin No. D602-4 describes line of portable pyrometers in single or double scale models. Specifications for proper selection of extension holders, adapters and thermocouple tips are listed in chart form.

6. Chain Hoists

Reading Chain & Block Corp.—36-page illustrated catalog No. 60 presents information on how to select proper chain hoist for given job. Capacities, lifting speeds, applications and operating efficiencies of various types of chain hoists are covered.

7. Face Shield

American Optical Co.—Single page illustrated data sheet describes type A-O 506 face shield. Unit is designed to protect face on jobs such as babbitting, handling chemicals and on operations in manufacture of high octane gas.

8. Vibrators

Cleveland Vibrator Co.—8-page illustrated folder entitled "Vibrators" covers nine models of vibrators for every type of foundry application. Piston ring shakeout, chain or hoist shakeouts, hook style for flasks and cores, and wedge type for installation on coal cars are covered.

9. Abrasive Products

Norton Co. — 108-page diagramed handbook entitled "A Handbook on Abrasives and Grinding Wheels" deals with constant, variable and influential factors in grinding operations. Grinding examples, reference tables, handling, storage and inspection problems are covered. Special section includes grinding hints and selection table for recommended grinding wheels.

10. Foundry Equipment

Haynes Foundry Equipment Co.—Illustrated data sheet presents application information on complete line of sand mullers, core ovens, brass furnaces, jolt squeezers and worm gear ladles. Specifications are included.

11. Hoists, Trolleys, Cranes

Chisholm-Moore Hoist Corp.—Catalog No. 1946 is composite of fourteen illustrated bulletins covering hoists, trolleys and cranes. Construction and specification information covers five types of chain hoists, three types of I-beam trolleys, three types of electric hoists, hand power cranes, electric cranes and pullers.

12. Clamshell Buckets

C. S. Johnson Co.—8-page illustrated catalog "All-Welded Clamshell Buckets" covers general purpose, wide rehandling and heavy duty digging clamshell buckets in from ⅜ to 2½-yard capacities. Design drawings show features.

13. Heat Treating Equipment

Hevi Duty Electric Co. — 28-page illustrated bulletin No. HD 646 deals with Carburizer-Nitrider that provides circulation of furnace atmosphere up to 1850 F. It can be operated to produce accelerated cooling outside furnace with maintained protective atmosphere. Accessories, baskets, retorts, and loading charges are covered.

14. Grinding Speed Calculator

Electro Refractories & Alloys Corp.—Plastic slide rule provides aid to operators in determining wheel speeds and sizes for grinding jobs. To obtain surface feet per minute, revolutions per minute and diameter of grinding wheel are set in rule and correct answer is indicated. Back of slide rule charts maximum operating speeds for various wheels.

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15. Ladles

Whiting Corp.—Two 4-page illustrated bulletins describe features of Pour-Rite ladles for foundry use. Air cooled trunnions eliminate warpage and distortion. Gear bracket for tilting ladle is shown in phantom view.

16. Rotary Files & Burs

M. A. Ford Mfg. Co.—4-page illustrated folder "Ford Rotary Files & Burs" presents data on line of cylindrical, spherical, elliptical, tree-shaped, conical and reverse angle hand cut files and burs. Price list is included.

17. Electrode Selection Chart

Air Reduction Sales Co.—25 x 40-inch electrode selection chart is designed to assist operators in choosing correct electrode for particular job. Currents, mechanical properties and electrode colors are charted.

18. Materials Handling Truck

Rapids-Standard Co. — 6-page illustrated folder describes Wheel-Ezy case and keg truck. Height, weight, finish and capacity are listed and exclusive features are presented. Order blank is attached to folder.

19. Molding Units

Fellows Corp.—4-page illustrated bulletin entitled "How to Produce 360 Snap Molds per Hour" describes Fellows match plate molding unit and shows three typical standard handling systems to effect maximum production in minimum space.

20. Belt Conveyor Idlers

Chain Belt Co.—26-page illustrated bulletin No. 463 covers complete line of Rex belt conveyor idlers. Proper selection of idlers, details of construction and special applications are given. Impact-cushioning troughing idler and rubber covered spiral return type are described in detail.

21. Steel Foundry Flasks

Black, Silvalls & Bryson, Inc.—26-page illustrated catalog No. 18 presents data on twenty styles of steel foundry flasks for square, rectangular or round shapes. Special flasks are illustrated. Bushings and flask pins are shown. All flask surfaces are ground and parts are joined by electric arc welding.

22. Welding Electrodes

Metal & Thermit Corp.—92-page illustrated brochure "Murex Arc Welding Electrodes" reveals applications, characteristics, physical and chemical properties and recommended welding procedures for more than 40 Murex arc welding electrodes. New line of basic welding accessories is described.

23. Movable Steel Partitions

E. F. Hauserman Co.—40-page illustrated technical handbook No. 46 presents drawing, descriptions and specifications for complete line of Masterwall products including movable steel partitions, wall linings, ceilings, railings and accessories. Office planning and architect's information is included.

24. Diamond Tools

J. K. Smit & Sons, Inc.—Illustrated catalog provides answers to questions on boring, turning, roughing, semifinishing and form dressing with diamond tools. Blade and chisel tools, cone shaped tools, gage points and finger gages are covered.

25. Lift Trucks

Hyster Co.—8-page illustrated catalog "Hyster 20 Lift Truck" charts dimensions, load capacities and weights of model No. 20 lift truck. Standard lift to underside of load is 108 inches at rate of 40 feet per minute. Three-degree tilt forward and 70-degree tilt backward are possible.

26. Plastic Eye Mask

Standard Safety Equipment Co.—4-page illustrated folder "StaSaf Eye Mask" describes eye mask in which plastic lenses are injection molded individually. Lenses are molded to correct curve for natural vision without obstruction, reflection or distortion.

27. Fire Fighting Equipment

American-LaFrance-Foamite Corp.—Illustrated data sheet describes Airfoam-Generating nozzle for fire fighting. Nozzle, 2½ inches in diameter, mechanically creates foam through mixing of water, air and Foamite Airfoam. It is recommended for extinguishing inflammable oil, paint and varnish fires.

28. Industrial Flooring

Walter Maguire Co.—Illustrated bulletin reveals how Emeri-Crete flooring made with Cortland emery aggregates has been successfully applied in many foundries. Flooring is recommended for use where heavy steel skids and steel wheeled trucks are operated. Installation data are included.

29. Materials Handling Trucks

Rapids-Standard Co. — 4-page illustrated folder No. TR-NSP-4 presents detailed specifications and illustrations on heavy duty and ordinary duty Handy-Andy modern floor trucks for materials handling for point-to-point operation in foundries.

30. Sand Conditioners

Newaygo Engineering Co.—4-page illustrated bulletin No. 201 describes aeration, blending, tempering, cooling and increasing of permeability of sand in Newaygo sand conditioners. Diagrams and specifications are included for reference.

31. Crane Buckets

Orton Crane & Shovel Co.—16-page illustrated catalog No. 75 is descriptive of five types of buckets for use with cranes. Capacities, weights and dimensions are listed. Also described are grapples for use in handling stacked material.

32. Aluminum Welding Manual

Reynolds Metals Co.—88-page illustrated manual "Welding Aluminum" deals with gas, arc and resistance welding, brazing and soldering operations used in joining aluminum. Welding practices in edge preparation, cleaning and preheating, welding flame, welding rods, fluxes and technique are covered.

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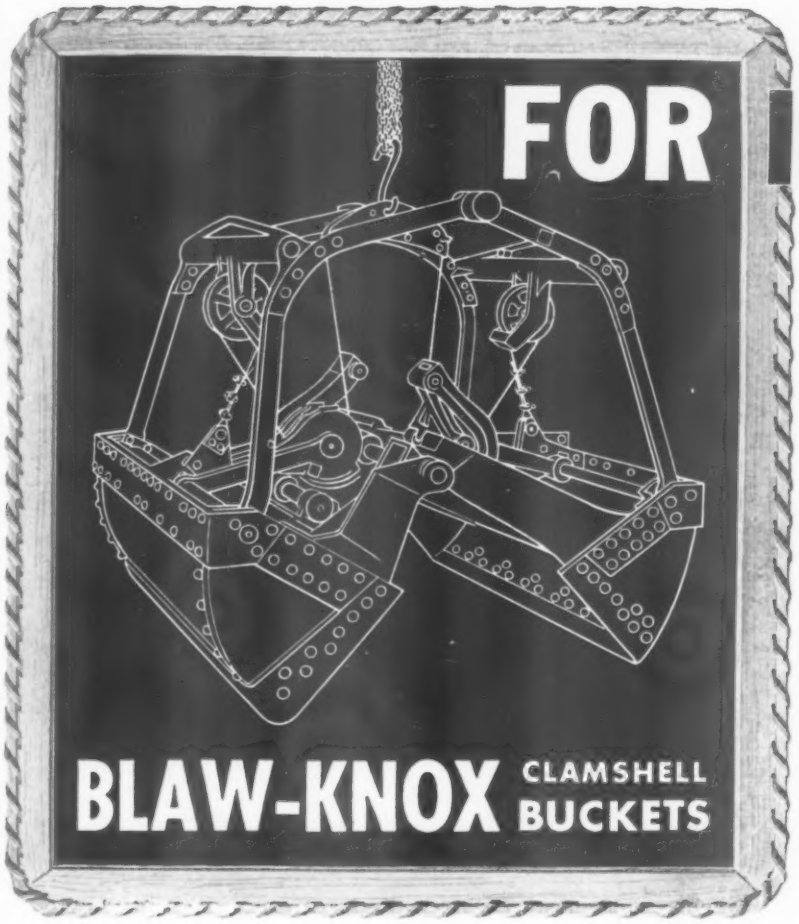

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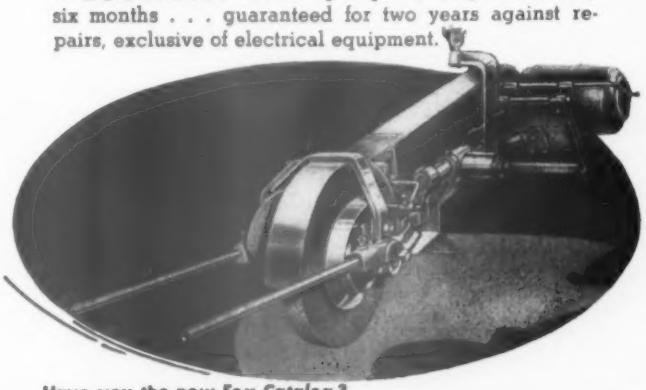

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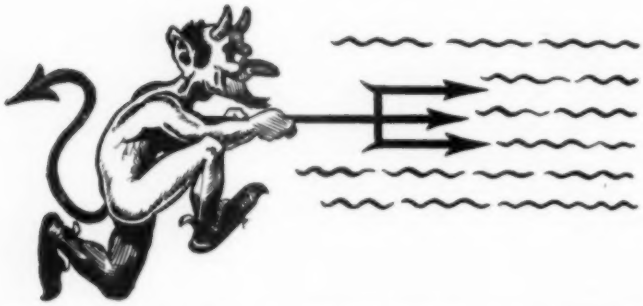

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THERMOTOMIC X-235 is a new exothermic material which is used to secure better feeding of castings. Its use permits reduced size of feeding heads or risers, substantially lowered cleaning costs of castings, as well as a great reduction in scrap losses. THERMOTOMIC X-235 is produced in powder form. It is mixed with water only, and can be molded into feeding ring cores or inserts of any desired shape and baked dry in exactly the same manner as sand cores. It raises the temperature of the metal where it is applied as feeding rings or inserts under the feeding heads, insuring better feeding of the metal into the mold and retarding solidification in those portions of the casting where rapid cooling may cause piping, shrinkage, or segregation.

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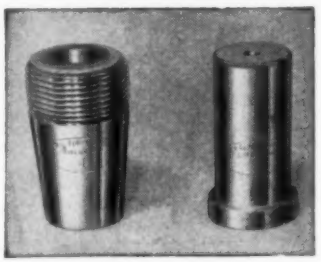

Wherever there is blast cleaning there ought to be a Federal Blast Nozzle. Made of cast tungsten-carbide (the hardest metal known to man) the Federal Blast Nozzle concentrates the blast, reduces air costs and outwears any nozzle previously offered for the purpose.

Being cast, the tungsten-carbide is pure—as is not the case when made by sintering.

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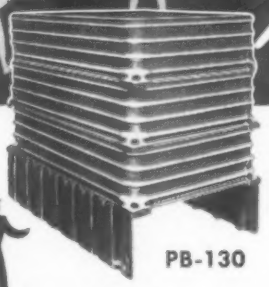

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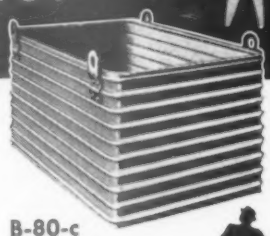

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"A Specific Type for Every Core Box"

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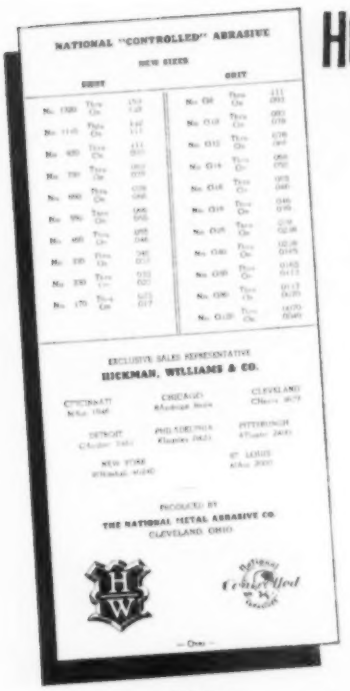

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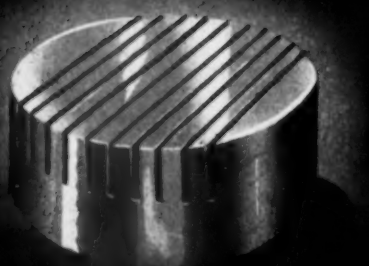

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Slot widths: .010", .013", .015"
Diameters: ⅛", 3/16", ¼", 5/16", ⅜", 7/16", ½", ⅝", ¾", ⅞", 1", 1¼", 1½"

STEEL SLOTTED CORE BOX VENTS
Slot widths: .010", .013", .015"
Diameters: ⅛", 3/16", ¼", 5/16", ⅜", 7/16", ½", ⅝", ¾", ⅞", 1", 1¼", 1½"

SCREEN TYPE CORE BOX VENTS
Mesh: #30, #40, #50.
Diameters: ⅛", 3/16", ¼", 5/16", ⅜", 7/16", ½", ⅝", ¾", ⅞", 1", 1¼", 1½"

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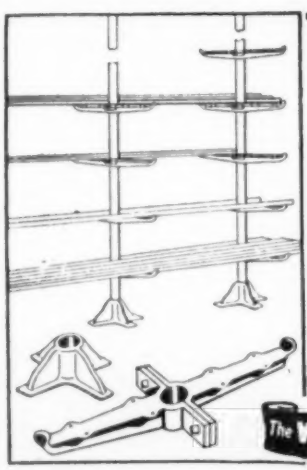

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Adjustable Rack

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GRINDING EXPERIENCE

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Our first consideration is

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Self Dumping

Careful balancing makes Penn Buckets self dumping when loaded and self righting when empty. Welded construction prevents "clinging" makes them empty easily and completely.

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THEY INCREASE PRODUCTION . . . KEEP COSTS DOWN!

An Illinois stove foundry writes, "We have been using your portable hand squeezers for a number of years and have had wonderful success with them. After installing them we were able to increase our production 25%." A Tennessee foundry says, "We are very much pleased with the operation of Moline machines and particularly the low upkeep cost." If your foundry does medium to small work on a production basis, we can show you how Moline Squeezers will save you money, too. There are four standard models which you may choose from. Illustrated here is the No. 33 Portable model which will handle flasks 12" x 24" or under.

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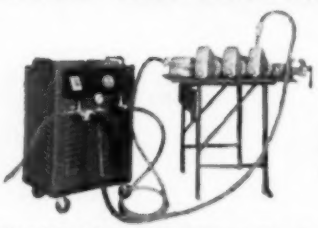

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Mogul Cast-Seal and Circulator will end your porous casting problems forever. Unit heats and circulates Mogul Cast-Seal under pressure through defective castings. Mogul Cast-Seal contains millions of minute metallic particles which penetrate deep into porous areas and tiny fissures building up a permanent metallic bond which will withstand pressures up to 2100 pounds. It's fast, low-cost and requires no training. Write for bulletin No. C-1-A.

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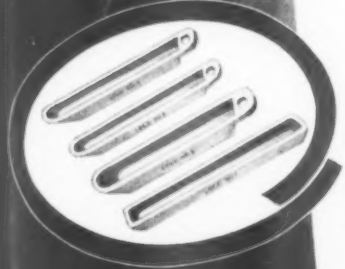

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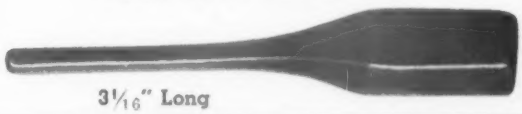
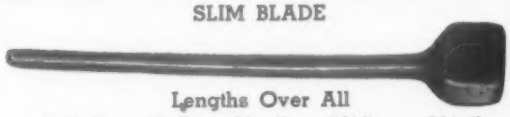


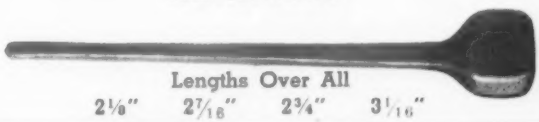
3 1/16" Long

SLIM BLADE



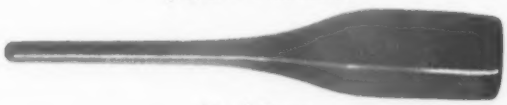
Lengths Over All
1 11/16" 2 1/8" 2 7/16" 2 3/4" 3 1/16"

MEDIUM BLADE



Lengths Over All
2 1/8" 2 7/16" 2 3/4" 3 1/16"

JUMBO PATTERN



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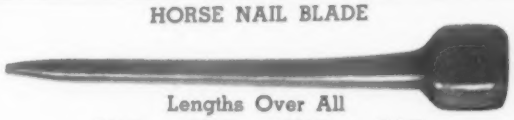
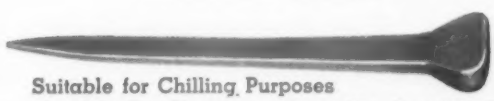


Lengths Over All
2 1/8" 2 3/8" 2 5/8" 2 7/8"

HORSE NAIL SECONDS



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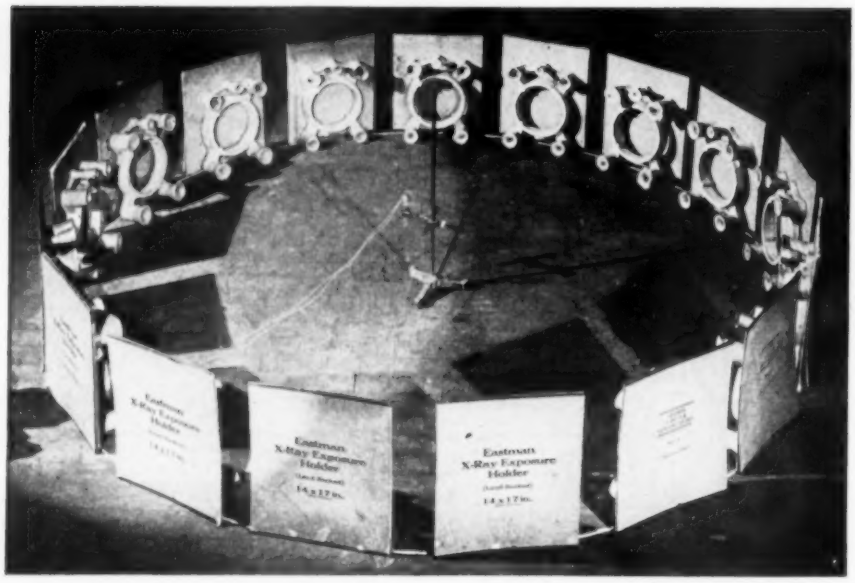

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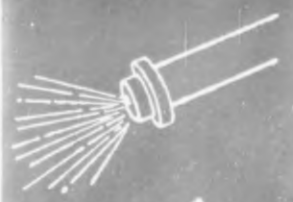

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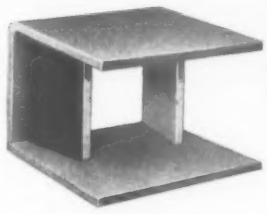

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Automatic Transportation Co., 121 West 87th St., Chicago 20, Ill.

TRUCKS (Power Lift)
Automatic Transportation Co., 121 West 87th St., Chicago 20, Ill.
Clark Tructractor Div. of Clark Equipment Co., Battle Creek, Mich.
Lift Trucks Inc., 2425 Spring Grove Ave., Cincinnati 14, Ohio.

TRUCK WHEELS
Bethlehem Steel Co., Bethlehem, Pa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

TUBES (Annealing)
Pressed Steel Co., Wilkes-Barre, Pa.

TUMBLING BARRELS
Cleveland Chaplet & Mfg. Co., 1197 West 67th St., Cleveland 2, O.
Haynes Foundry Equipment Co., 1734 Lake St., Kalamazoo 21 Mich.
N. Ransohoff Inc., 208 W. 71st St., Cincinnati 16, O.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

TURNTABLES
Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Modern Equipment Co., Port Washington, Wis.
Roto-Cast Foundry Equipment Inc., 100 Grand St., Coldwater, Mich.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

UNIT HEATERS
Dravo Corp., Neville Island, Pittsburgh 25, Pa.

UNLOADERS (Portable-Gas Electric)
Cleveland Formgrader Co., 6723 Denison Ave., Cleveland, Ohio

VALVES (Air, Water, Steam)
Air-Way Pump & Equipment Co., 405 S. Jefferson St., Chicago 7, Ill.
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.
North American Mfg. Co., 2910 E. 75th St., Cleveland 4, O.
R-S Products Corp., 4530 Germantown Ave., Philadelphia 44, Pa.

VALVES (Adjustable Orifice)
North American Mfg. Co., 2910 E. 75th St., Cleveland 4, O.

VALVES (Blow-off and Cut-off)
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, O.
Wm. H. Nicholls Co., Richmond Hill, Long Island 18, N. Y.

VENTILATING SYSTEMS
American Foundry Equipment Co., 505 S. Byrkit St., Mishawaka Ind.
Joy Mfg. Co., La-Del Division, New Philadelphia, Ohio.
Kirk & Blum Mfg. Co., 2538 Spring Grove Ave., Cincinnati 25, O.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Co., Cleveland 4, O.
Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, O.
Sturtevant Co., B. F., Div. of Westinghouse Electric Co., Hyde Park, Boston, Mass.
Swartwout Co., 1851 Euclid Ave., Cleveland 15, Ohio.

VENTILATORS (Roof)
Swartwout Co., 1851 Euclid Ave., Cleveland 15, Ohio.

VENTS (Core Box)
Champion Foundry & Machine Co., 1314 W. 21st St., Chicago 8, Ill.
Demmler & Bros., Wm., Kewanee, Ill.
Reinacker Industries, 2035 Hilton Rd., Ferndale, Mich.
Sinel Co., 1405 Philadelphia Drive, Dayton 6, O.
C. M. Smillie & Co., 1100 Woodward Hgts. Blvd., Ferndale, Mich.

VIBRATORS
Adams Co., Dubuque, Iowa.
Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.
Davenport Machine & Foundry Co., Davenport, Iowa.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland 11, O.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Martin Engineering Co., Kewanee, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.
Nicholls Co., Wm. H., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S P O Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Syntron Company, Homer City, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

VIBRATORS (Core Bench)
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.

WARM AIR HEATERS
Dravo Corp., Neville Island, Pittsburgh 25, Pa.

WASH ROOM EQUIPMENT
Bradley Washfountain Co., 2217 W. Michigan St., Milwaukee, Wis.

WAX (Core, Vent, Pattern)
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland 11, Ohio.
PMS Co., 1701 Power Ave., Cleveland 14, O.
United Compound Co., Inc., 328 South Park Ave., Buffalo 4, N. Y.

WEDGES (Foundry)
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WELDING GAS
Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago 23, Ill.

WELDING APPARATUS (Electric Arc)
Metallizing Company of America, 1330 W. Congress St., Chicago 7, Ill.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

WELDING and CUTTING APPARATUS and SUPPLIES
Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago 23, Ill.

WELDING ELECTRODES (Carbon)
National Carbon Co., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.

WELDING RODS & ELECTRODES
Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.
Metallizing Company of America, 1330 W. Congress St., Chicago 7, Ill.

WHEELBARROWS
Construction Machinery Corp., Waterloo, Iowa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WHEELS, ABRASIVE (Cut-off)
Bay State Abrasive Products Co., Westboro Mass
Bridgeport Safety Emery Wheel Co. Inc., Bridgeport, Conn.
Carborundum Co., Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
General Grinding Wheel Corp., West Abrasives, Inc., 3132 East Thompson St., Philadelphia, Pa.
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Keystone Abrasive Wheel Co., Carnegie, Pa.
Raybestos Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J.
Macklin Co., Jackson, Mich.
Mid West Abrasive Co., Detroit, Mich.
Norton Company, Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit, Mich.
Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
Sterling Grinding Wheel Division, Cleveland Quarries Co., Tiffin, Ohio.

WHEELS (Wire)
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE BRUSHES
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE NAILS
Bethlehem Steel Co., Bethlehem, Pa.
Republic Steel Corp., Cleveland 4, O.

WOOD FLOUR
Ace Foundry Materials Co., 14611 Fenkell Ave., Detroit 27, Mich.

WOODWORKING MACHINERY
Delta Mfg. Co., 620 E. Vienna Ave., Milwaukee 1, Wis.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland 11, Ohio.
Oliver Machinery Co., Grand Rapids 2, Mich.

X-RAY EQUIPMENT
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

X-RAY FILMS
Eastman Kodak Co., Rochester, N. Y.

X-RAY INSPECTION
Magnaflux Corporation, 5910 Northwest Highway, Chicago 41, Ill.

ZINC
American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.

Classified Advertising

Help Wanted

MALLEABLE FOUNDRY

SUPERINTENDENT

Write, giving age, education experience and full particulars.

FRAZER and JONES CO.

SYRACUSE, N. Y.

PERMANENT TEACHER

Foundry practice in large trade school in Philadelphia, beginning as soon as possible. To teach elementary foundry practice to boys 13 to 14 years old, but occasionally to operate, on a production basis, with older boys, small foundry handling gray iron, brass, bronze and aluminum. Practical experience, some engineering education, good personality, character and capacity to develop are essential. Resident of Philadelphia area, under forty, preferred. Salary $2,000-$3,000 according to experience. Apply giving full details on age, education, experience, references. Address: Box 941, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN

Middlewest Foundry. Normal production 15 to 20 tons daily. Must be able to handle men and direct operation of cupola. Work consists of small castings on squeeze machines and other machine work, together with floor molding. Castings usually running up to three or four hundred pounds and occasionally die blocks weighing one to two tons. Applicants please state salary desired and when available. Address: Box 809, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRYMAN

To take charge of foundry producing medium size squeezer work. Must understand foundry practice and able to handle help. Good opportunities for hustler. State age, experience and salary desired. Address: Box 933, The FOUNDRY, Cleveland 13, Ohio.

METALLURGIST
OR
PRACTICAL SUPERINTENDENT

To take full charge of brass and bronze ingot smelting department in Eastern Pennsylvania. Permanent position. When replying give past experience, references and salary expected. Address: Box 878, The FOUNDRY, Cleveland 13, Ohio.

PLANT SUPERINTENDENT

For Gray Iron Foundry in East. Must have knowledge of production methods and equipment and have the ability to oversee and correct production difficulties. Must have ability to work well with other supervisors and employees. State in detail education, experience, references and salary requirements. Address: Box 940, The FOUNDRY, Cleveland 13, Ohio.

STEEL FOUNDRY FOREMAN

West Coast foundry desires an experienced and aggressive foundryman to supervise all phases of molding. Acid electric shop. Must be familiar with production control and scheduling. Address: Box 872, The FOUNDRY, Cleveland 13, Ohio.

CLEANING ROOM SUPERINTENDENT

Mid-west specialty foundry has opening for a man 30-45 years of age. Does not necessarily need to be familiar with cleaning room procedure. Must be able to get production, handle manpower and generally cooperate with foundry organization. Reply giving full details, age, experience and salary desired. Replies held confidential. Address: Box 919, The FOUNDRY, Cleveland 13, Ohio.

Help Wanted

EXECUTIVE ENGINEER WITH MECHANICAL EXPERIENCE

Must have broad general plant supervisory experience and thorough knowledge of tool room and general machine shop practice, with some knowledge of general foundry practice.
Must have proven executive capacity and capable of directing labor relations.
Plant located at Cleveland, Ohio. 1000 employees engaged in the manufacture of pipe fittings.

BOX 889
THE FOUNDRY CLEVELAND 13, OHIO

YOUNG FOUNDRY EXECUTIVE

By large jobbing foundry. Qualifications as follows: Must have had five or six years of well rounded experience, either malleable or steel, in molding, sand control, pattern design, and core making. Prefer man 30 to 35 years of age. Write fully, age, experience, salary requirements. Address: Box 932, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN

Gray iron and semi-steel jobbing foundry, 50 miles west of Chicago, pouring approximately 20,000 pounds per day. To take charge of foundry operations. 20 molders, bench, squeezer, floor and rollover machine work. Give references and salary expected. Address: Box 917, The FOUNDRY, Cleveland 13, Ohio.

MELTER

TECHNICALLY TRAINED MAN CAPABLE OF TAKING CHARGE OF ELECTRIC MELTING DEPARTMENT. MUST HAVE HAD EXPERIENCE ON HIGH ALLOY AND CARBON STEEL. ADDRESS: BOX 876, THE FOUNDRY, CLEVELAND 13, OHIO.

BRASS FOUNDRY FOREMAN

A working foreman to assist Foundry Superintendent in a well equipped production brass foundry; good opportunity for a hustler. State age, experience and salary desired in first letter. Address: Box 192, The FOUNDRY, Cleveland 13, Ohio.

BRASS OPEN HEARTH OPERATOR

Secondary nonferrous refiners. Midwestern Region. State experience, qualifications, references and wages desired in first letter. Address: Box 866, The FOUNDRY, Cleveland 13, Ohio.

ALUMINUM OPEN HEARTH OPERATOR

Secondary nonferrous refiners. Midwestern Region. State experience, qualifications, references and wages desired in first letter. Address: Box 867, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

One thoroughly experienced in foundry operation who could assume executive responsibility in an old established firm. Possible to acquire part equity, if desired, in the business. In replying state age, experience, references and other details. Location—Central West. Address: Box 871, The FOUNDRY, Cleveland 13, Ohio.

WANTED
SALESMEN or MANUFACTURERS' AGENTS
Now calling on foundries and forgings companies to handle complete line of Missouri refractories. Write in detail giving territories now covered, products handled, qualifications, etc. Address: Sales Manager, Chicago Fire Brick Company, 1467 Elston Ave., Chicago 22, Ill.

FOUNDRY SUPERINTENDENT

For plumbing fixture foundry, using 2 Beardsley Slingers. In Pennsylvania, good opportunity. Give full particulars. Address Box 916, The FOUNDRY, Cleveland 13, Ohio.

MOLDER FOREMAN

Experienced on medium and heavy grey iron castings. For old established firm in Cleveland. Write stating qualifications. Address: Box 924, The FOUNDRY, Cleveland 13, Ohio.

MOLDERS

Experienced loam molders on medium heavy jobbing work. Write or apply EMPLOYMENT OFFICE, NORTH PLANT, WYANDOTTE CHEMICALS CORP., WYANDOTTE, MICHIGAN.

Help Wanted

PERSONNEL
DIRECTOR
WANTED

Capable of handling all labor relations for two plants working under union contracts. Approximately 300 employes. Give education, experience, salary desired.

BOX 928

THE FOUNDRY CLEVELAND 13, OHIO

ASSISTANT FOUNDRY SUPERINTENDENT

For aluminum foundry located in the New England area. Must be experienced in handling men. Give full qualifications and past experience.

BOX 908

The FOUNDRY CLEVELAND 13, OHIO

SUPERINTENDENT

Young, for long established grey iron and semi-steel captive foundry. 30 ton daily. Strong on cupola, sand, gating and risering and know how to handle men. South Central Pennsylvania. Address: Box 879, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Experienced, practical and technical training, familiar with all phases of ferrous and nonferrous practice, for general consulting and advisory capacity with established well-known organization. Submit detail of experience and salary desired. Address: Box 931, The FOUNDRY, Cleveland 13, Ohio.

MOULDERS WANTED

On Tablet and Ornamental Bronzes. State age, last places worked and when you can start work. Eight hour day, forty hour week. Steady job. Address Box 816, The FOUNDRY, Cleveland 13, Ohio.

PATTERN MAKER

Experienced on master patterns, core boxes for production brass foundry producing small castings. Good working conditions, small town, year around job. Give full information about yourself in first letter. Address: Box 805, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERVISOR

For nonferrous production, Mid-Michigan city. Complete charge approximately 25 squeezer, bench and floor molders. Excellent opportunity. State full experience and salary expected in first letter. Address: Box 913, The FOUNDRY, Cleveland 13, Ohio.

EXPERIENCED CUPOLA TENDER

For grey iron foundry located in the Youngstown, Ohio, area, good wages. This is a real opportunity for the right man. Reply giving experience, references and other qualifications. All replies held in strict confidence. Address: Box 925, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

For a nonferrous foundry manufacturing small castings. Excellent living conditions, good wages and chance for advancement. Growing concern. Address: Box 945, The FOUNDRY, Cleveland 13, Ohio.

IRON FOUNDRY SUPERINTENDENT

Practical foundrymen for jolt squeezer shop on light grey iron castings, capable of rigging flasks and gating patterns for efficient production as well as the training of inexperienced foundry help. Address: Box 950, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Help Wanted

PATTERN MAKER
Both metal and wood, for malleable foundry. State experience and rate of pay required. Address: Box 944, The FOUNDRY, Cleveland 13, Ohio.

WANTED
Foundry foreman and core room foreman for production grey iron foundry located in the Middle West. Address: Box 926, The FOUNDRY, Cleveland 13, Ohio.

OUR MEMBERS NEED FOUNDRY PERSONNEL
Foundry Foremen and Superintendents—Core Room Foremen—Engineers well grounded in foundry practice. Address: NATIONAL FOUNDERS ASSOCIATION, 120 SOUTH LaSALLE ST., CHICAGO 3, ILL.

MANUFACTURER'S AGENT
For Houston, Texas; Milwaukee; Buffalo, New York, to represent Mid-west alloy foundry manufacturing highest quality STAINLESS STEEL AND HEAT RESISTANT CASTINGS, statically and centrifugally cast. Write in detail, giving territory covered, products handled and types of industries served. Address: Box 921, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

ASSISTANT SUPERINTENDENT FOUNDRY METALLURGIST
B.S. Metallurgical Engineering—6 years' experience as Foundry Metallurgist in charge of control and production in brass, bronze, aluminum, steel, gray iron and malleable foundries. Want permanent position with established, reliable company. Address: Box 883, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE DESIRES
Connection with bronze and/or iron foundry in charge of manufacture or sales. Clear understanding of operations and handling personnel and knows application of metals. Past earnings over $20,000 per year. Sixty days' notice. Address: Box 762, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT
Practical iron foundryman. Technically trained. Has broad working knowledge of all foundry activities in production and jobbing foundries. Experienced in mold conveying, sand preparation and distribution. Had charge of foundries producing up to 125 tons daily. Good record handling union labor. East or Middle West preferred. Address: Box 846, The FOUNDRY, Cleveland 13, Ohio.

STAINLESS AND ALLOY CAST STEEL
ASSISTANT MANAGER AND PROCESS ENGINEER AVAILABLE SOON. EXPERT ON GATING AND RISERING. 22 YEARS OF FOUNDRY EXPERIENCE. EXPERIENCED IN ALL PHASES OF THE MANUFACTURE OF STEEL CASTINGS. WELL VERSED IN FOUNDRY COSTS, CAN INCREASE YOUR YIELD, REDUCE YOUR SCRAP AND IN GENERAL INCREASE YOUR EFFICIENCY AND PROMOTE A BETTER QUALITY PRODUCT. PREFER MIDWEST LOCATIONS. ADDRESS: BOX 897, THE FOUNDRY, CLEVELAND 13, OHIO.

FOUNDRY EXECUTIVE
Graduate engineer, 35, with 12 years' practical experience in supervision of production of highest quality gray iron castings desires change from present position. Excellent knowledge gray iron metallurgy and sand control. Practical experience in cupola operation, molding and coremaking. Wide experience correcting casting defects. Available at short notice. Address: Box 914, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT OR GENERAL FOREMAN
45 years of age, 28 years' practical experience in the foundry from molder, coremaker to superintendent in general jobbing, machine and production. Good rigger on patterns, flasks and mechanized equipment. Want to make connection with a reliable company that needs a foundryman of my experience. Am available at once. Address: Box 891, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

FOUNDRY EXECUTIVE
Technical education with 20 years' experience as Manager and Superintendent in modern high production, jobbing and development foundries. Primarily interested in grey iron but also have unusual nonferrous experience. Capable of handling all foundry departments and machine shop. Successful in handling an organization of several hundred employees. Location is not important. Address: Box 901, The FOUNDRY, Cleveland 13, Ohio.

NONFERROUS METALLURGIST
B. S. in metallurgical engineering. Three years' experience in foundry research, principally copper-base alloys. Desire position in development or production capacity. Middle West preferred. Address: Box 904, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE
Foundryman with 32 years of gray iron automotive castings production experience. Practical experience in all phases of foundry operations. Last eighteen years as superintendent and manager. Available with short notice. Address: Box 874, The FOUNDRY, Cleveland 13, Ohio.

AVAILABLE
Foundry and industrial engineer, for modernization, mechanization, surveys, wage incentives, production controls, cost control in grey iron, malleable and steel, on consulting or short term contract basis. Address: Box 813, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRYMAN
Wants to make new connection. Practical experience with technical training and cost minded. Experienced with work ranging from a few pounds to ten ton. Good rigger for production. Understand gray iron metallurgy. Mix iron by analysis. A1 cupola supervision. Capable of handling a foundry organization as top management, assistant to a busy executive or as a foundry superintendent. Middle age. Good personality. Address Box 834, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY ENGINEER
Diversified experience in gray iron and steel. Outstanding record of accomplishment trouble shooting on production. Skilled in foundry layout, plant design and mechanization. Well versed on scientific melting and mixing. Address: Box 571, The FOUNDRY, Cleveland 13, Ohio.

PATTERNMAKER
Capable of taking over shop, estimate cost and layout work to produce accurate sound castings. General pattern shop experience both wood and metal patterns and driers and core blowing. Ability to handle men and train apprentice. First class mechanic and can qualify as working foreman in small shop or supervise large shop. Address: Box 779, The FOUNDRY, Cleveland 13, Ohio.

PRACTICAL ALUMINUM FOUNDRYMAN
Technically trained. Has broad working knowledge of all foundry activities in production and jobbing. Desire full management of foundry using alloy aluminum, capable of estimating and selling. Complete knowledge of heat treating and engineering of design. Interested in locating in southwest section of United States. Address: Box 930, The FOUNDRY, Cleveland 13, Ohio.

EXPERIENCED YOUNG FOUNDRY MAN DESIRES POSITION
Experienced in production and experimental, semi and permanent mold work; using pure and alloy aluminum. Have made castings from 3 oz. to 125 lbs. Experienced with electric induction furnace and electric holding furnaces. Have some heat treat and inspection knowledge. Presently employed as foundry foreman. Have excellent references. Desire to locate in eastern states. Address: Box 937, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

GRAY IRON FOUNDRYMAN
48 years of age, desires sales position. Preferably in Northwestern Ohio. Well acquainted. Have car. Address: Box 920, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT
Practical and technical training. 25 years in supervisory capacity. Medium and heavy, high grade jobbing or production gray iron or semi-steel. Well versed all modern methods and metallurgy. Address: Box 939, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT
Foundryman, practical and technical training, open hearth, electric and cupola. Wide knowledge metallurgy, sand control, sales and estimating. Age 37. Address: Box 887, The FOUNDRY, Cleveland 13, Ohio.

STEEL MELTING PROBLEMS
And allied testing—control consulting based on twenty years' practical operating and control experience. All grades—acid and basic electric and open hearth. Highest references from successful results. Address: Box 949, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRYMAN
Broad foundry and management experience capable of directing operations efficiently and profitably. A practical executive with qualified record for maintaining good customer and personnel relations and working out foundry problems promptly and effectively. Address: Box 947, The FOUNDRY, Cleveland 13, Ohio.

NONFERROUS ENGINEER
B.S. in chemical engineering—three years' experience in foundry research involving foundry metallurgy and chemical engineering principles. Desire development or production work. New England area preferred. Address: Box 946, The FOUNDRY, Cleveland 13, Ohio.

STEEL FOUNDRY SUPERINTENDENT
My entire career has been in the steel foundry industry. I have acquired a thorough knowledge of all the problems related to a foundry. Experienced in labor relations. Immediately available. Age 45 years. Address: Box 948, The FOUNDRY, Cleveland 13, Ohio.

GENERAL MANAGER MATURE, CAPABLE, DEPENDABLE
With a record that assures you that he can manage your business energetically and safely and develop its possibilities fully and profitably. Excellent experience foundry, machinery and allied lines. General management established medium-sized business primary objective. Correspondence in confidence. Address: Box 598, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY OR FACTORY ASSISTANT MANAGER
35 years old, 3 years' college education, 8 years' malleable, grey iron, metal pattern making and machine shop experience. 6 years' metallurgical research laboratory large steel corporation as head of testing department and company representative. Large capacity for work. Address: Box 938, The FOUNDRY, Cleveland 13, Ohio.

PATTERN FOREMAN
With 20 years' experience running shops. Fine working knowledge of foundry practice. Have been connected with steel, brass, aluminum and at present with grey iron foundry. Can estimate from blueprints. Jobbing or production work, wood and metal. Best references from past employers. Address Box 923, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN
27 years' experience in aluminum, brass and iron on loose, jolt-squeeze and rollover work. Supervision of gating and rigging. Address: Box 952, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY ENGINEER
Engineering graduate—eight years in molding and melting, engineering and supervision, alloy and high strength gray iron. Experience covers jobbing and production, pit, floor, bench, squeeze, rollover and slinger. Address: Box 953, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Employment Service

SALARIED POSITIONS
$2,500-$25,000

This thoroughly organized confidential service of 36 years' recognized standing and reputation carries on preliminary negotiations for supervisory, technical and executive positions of the calibre indicated. Retaining fee protected by refund provision. Identity covered and present position protected. Send only name and address for details.

R. W. BIXBY, INC.
101 Dun Bldg. Buffalo 2, N. Y.

Opportunities

OPPORTUNITY

We can furnish empty tight and slack wooden barrels also steel drums for your products. ADDRESS: BUCKEYE COOPERAGE STATION, C.P.O. BOX 1501, CLEVELAND, OHIO.

Capacity Wanted

WANTED

Foundry to make small gray iron castings. Can give contract for 350 to 500 ton first year. Pattern plates furnished. Address: C. G. S., P. O Box 31, Oconto, Wis.

Open Capacity

OPEN CAPACITY

Have open capacity for grey iron foundry work. Weight range 20 to 1000 pounds. Address: Box 898, The FOUNDRY, Cleveland 13, Ohio.

OPEN CAPACITY

For brass, bronze and aluminum castings. Address: WACO FOUNDRY, P. O. BOX 30, ELMIRA, NEW YORK.

OPEN CAPACITY

Small foundry in Iowa making grey iron castings. Have some open capacity. Address: Box 922, The FOUNDRY, Cleveland 13, Ohio.

Foundries For Sale

BANKRUPTCY SALE

Completely equipped Pattern Shop, aluminum and brass foundry; daily capacity 7500 pounds aluminum and 3000 pounds of brass.

50 by 75 brick building, office and pattern shop.

80 by 100 foundry, concrete, iron and steel pipe construction. Trackage available.

6½ acres adjacent to North American Aviation Plant, Grand Prairie, Texas.

Situated in Fort Worth—Dallas metropolitan area.

Inspection by appointment.

For bidding instructions contact:

BURTON B. PADDOCK, TRUSTEE
608 FIRST NATIONAL BANK BLDG.
FORT WORTH 2, TEXAS
PHONE 3-3252

GREY IRON FOUNDRY

Jolt squeezer shop located in Eastern section of middle west with approximately 50,000 sq. feet of ideal foundry buildings now in operation. Address: Box 951, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Controlling interest in nonferrous foundry located in central Michigan, with standard line of production including bearings and refrigerator compressor parts. Plant modernized, doing international business; ideal location, rail and water facilities. Address: ADAM HOPE CO., 1627 W. FORT, DETROIT 16, MICH., RANDOLPH 3540.

Foundries For Sale

FOR SALE

Small foundry in Middle West, equipped for the making of brass, malleable or grey iron. Address Box 852, The FOUNDRY, Cleveland 13, Ohio

FOUNDRIES FOR SALE

IRON FOUNDRY with machine shop. Good buildings. RR siding. Rural community.

FOUNDRY BUILDING. 24,000 sq. ft. 2 cupolas. Providence, R. I. Price reasonable.

GRAY IRON FOUNDRY. Produces castings from 1 lb. to 5 tons. Has up-to-date equipment. Excellent opportunity for machinery builder to secure own source of castings.

EDWARD H. ZOLL
INDUSTRIAL PROPERTIES THROUGHOUT THE EAST
790 BROAD ST. NEWARK 2, N. J.
PHONE MARKET 3-4539.

FOR SALE

Small brass and aluminum foundry in Northwestern Pennsylvania. Annual sales approximately $125,000. For information write Box 918, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRY FOR SALE
—In Chicago-Milwaukee Area—

50% of buildings new in the last two years, all equipment new. 25,000 square feet of molding space. 15 tons of constant daily production in light type work at present capacity up to 50 tons a day. No labor trouble—a smooth running organization. Address: Box 915, The FOUNDRY, Cleveland 13, Ohio.

Correspondence Course

THE CUPOLA IS THE HEART OF THE FOUNDRY

Turn the searchlight of McLain's System on your cupola. 90c of every dollar is spent before melting begins—but some make it look like 30c by indifferent melting. Are you using the maximum percentage of steel scrap in your castings? If not, why not? The value of the scrap pile lies in the fact it offers you food for thought. Our system is worth the fee as a desk reference. Synopsis free.

McLAIN'S SYSTEM INC.
236 E. NORTH AVE., MILWAUKEE 12, WIS.

Wanted-To-Buy

WANTED

Equipment for new Eastern foundry:—#5 or 6 cupola with blower; jolt squeeze, pin lift, roll-over molding machines; small corer, snap flasks; grind stands; cleaning equipment. PIONEER FOUNDRY & MFG. CO., GILBERTVILLE, MASS.

WANTED

Core blowing machine for medium size cores. Give full particulars. Address: P. O. Box 63, Lansdowne, Pa.

Wanted-To-Buy

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Small gray iron foundry located in Southern New York state or Northern Pennsylvania. Address: Box 929, The FOUNDRY, Cleveland 13, Ohio.

TO BUY, LEASE OR RENT

Small general jobbing foundry, preferably on the West Coast. Address: Box 927, The FOUNDRY Cleveland 13, Ohio.

WANTED
STEEL FLASKS

What have you? Condition, particulars and price. Address: St. Jerome Industries Ltd., Castonguay St. West, St. Jerome, Prov. Quebec, Canada.

WANTED

All the equipment to outfit a small foundry for making small parts. Send catalogues. Address: Adolph Mohler, Onamia, Minn.

WANTED

No. 2 used Simpson mixer, 6 foot diameter, either with or without drive and motor. Address: Box 936, The FOUNDRY, Cleveland 13, Ohio.

MACHINERY WANTED

Used tractor-type sand slinger. Give full information regarding same when replying.

BASTIAN-MORLEY CO., INC.
LA PORTE, INDIANA

WANTED
STEEL
BUILDINGS
And
CRANE RUNWAYS

Economy Co. Inc.
49 Vanderbilt Ave.
New York, N. Y.
Call or Wire Collect

URGENT
WANTED TO BUY

#3 Simpson mixer and 24" wide apron or oscillating conveyor any length. Gravity roller conveyor 18" wide total length 400 feet. Address: Box 934, The FOUNDRY, Cleveland 13, Ohio.

MACHINERY WANTED

36" x 48" or 48" x 48" foundry bumper. State make, age, location and price.

BOVAIRD & SEYFANG MFG. CO.
BRADFORD, PA.

WANTED

1 American Wheelabrator, size 27 x 36 with loading device. Immediate delivery. Address: 862 The FOUNDRY, Cleveland 13, Ohio.

WANTED

27" x 36" American wheelabrator. Prefer complete with motors and loading skip. Advise price, age and location. Address: Box 902, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

For Sale

FOR SALE

OVERHEAD ELECTRIC TRAVELING CRANES

	TONS	MAKE	SPAN	CURRENT
(1)	10	Shaw Box	40'0"	220-VAC
(1)	10	Northern	60'0"	440-VAC
(1)	10	Champion	86'0"	440-VAC
(1)	15	Shaw	106'8"	230-VDC
(1)	125/25	Morgan	100'0"	230-VDC

ELECTRIC MONORAIL HOISTS

(1)—½-ton American LoHed 230-VDC.

(6)—½-ton Shepards, 230-VDC, 5-HP. motor HIGH SPEED, FL. OP., 30'0" lift.

(1)—1-ton Shepard 230-VDC., FL. OP.

SPECIAL: 7½-ton, 2-motor, cage operated, Shepard 230-VDC., 40'0" lift, enclosed for out door service, hoist 28/70-FPM., Trolley 400-FPM., an excellent hoist for scrap yard service or cupola charging.

ALL ABOVE IN STOCK OFFERED REBUILT & GUARANTEED.

SEND FOR OUR STOCK LIST OF A.C. & D.C. GENERAL PURPOSE, CRANES & MILL MOTORS, ELECTRIC BRAKES & CONTROL EQUIPMENT, MOTOR GENERATOR SETS, TRANSFORMERS, ETC., OF ALL SIZES.

T. B. MACCABE COMPANY
4300 CLARISSA ST.
PHILADELPHIA (40), PENNA.

FOR SALE

Shaw 10 ton electric foundry crane
2 Cullem Cupolas for iron
2 large Connersville Blowers

CHARLES S. JACOBOWITZ COMPANY
3080 MAIN STREET
BUFFALO, N. Y.
PHONE AMHERST 2100

FOR SALE

International Type JW stripper. Will take pattern eighteen inches wide—ten inch strip—good operating condition.

CAST METALS CORPORATION
DESHLER, OHIO

FOR SALE

Demmler Core Blower, #4E, 50" wide, 52" high clearance area — NEW — complete with sand elevator.

THE COOPER ALLOY FOUNDRY CO.
HILLSIDE, N. J.

FOR SALE

1—Ransohoff Water Mill 36 x 60 side loading and end loading. Automatic star separation and star return. Complete with direct drive and in good condition.

1—405 Osborn Jolt Roll-over pattern draw; jolt cylinder 12" dia. Pattern draw 18" max. flask limit 64".

1—46" dia. x 56" inside length tumbling barrels.

2—30" dia. x 42" inside length tumbling barrels.

BOX 635
The FOUNDRY CLEVELAND 13, OHIO

For Sale

FOR SALE

Flask bands in good used condition. Available in small lots and various sizes from 10 x 14 to 16 x 16. Write for list and prices—Attention Mr. K. W. Comstock.

GALE MANUFACTURING CO.
Albion, Michigan.

FOR SALE

Sly Tumbling Mill 36" x 72" x 1"
*Sly S. B. Cabinet Type A 36" x 60" with No. 11 Dust Hopper, motor exhaust.

*Purchased new 1944.

N. P. NELSON IRON WORKS, INC.
820 BLOOMFIELD AVE.
CLIFTON, N. J.

MATCHPLATES FOR SALE

Matchplates for casting Dutch Ovens, Skillets, Chicken Fryers and other items of cast iron hollow ware. Take over orders on hand for these popular items. For complete particulars address: Box 943, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

1—6'3" diameter Heroult melting furnace, rated one ton per hour, with holding capacity of 4000/4500#, with motors, roof rings, electrode holders, ladles, etc. and including 1000 kva. 22,000 to 110 volt transformer, 3 phase, 60 cycle. Also includes other electrical equipment ready to set up. Inspection invited. Address: FIRTH STERLING STEEL COMPANY, McKEESPORT, PA.

FOR SALE

One hovel barrel blast with sand generator model 32/40. Address: Box 935, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

1 Water Tumbler 24" x 32" complete with reducing pulleys $225.00
1 Core Blower, Redford bench cartridge type (new) $275.00
4 Melting Furnaces for #60 or #70 crucibles (no burners) $65.00
1 Royer portable sand conditioner (large size) $425.00
1 Permanent mold for 9½" aluminum frying pan $500.00

GRAND RAPIDS CASTINGS CO.
1315 MICHIGAN AVE., N.E.
GRAND RAPIDS 6, MICH.

FOR SALE

Jeffrey sanditioner, semi-portable #3. Purchased new in September, 1942. Now operating daily. Good condition. Required: Portable #1 to replace the #3. Address: Box 895, The FOUNDRY, Cleveland 13, Ohio.

CENTRIFUGAL COMPRESSORS AND BLOWERS

5000 cfm @2# Spencer CC with 75 HP 3/60/1750 RPM motor.
1200 cfm Buffalo, 9½ x 7 x 7¼ with 7½ HP, 220/3/60 1750 motor.
800 cfm @1½# American Sirroco blower with 10 HP 3/60/3600 RPM motor.
675 cfm @ 6 oz. Spencer turb. blower with 2 HP 3600 RPM 3/60/440/220 volts.
600 cfm @3# Spencer turb. blower with 10 HP, 1700 RPM motor.
586 cfm @11½ oz. McKee 4 x 4 Blower.
500 cfm @14½oz. McKee 6 x 6 Blower
225-400 cfm @1# Sturtevant CC with 3 HP 3/60/3600 RPM motor.
20¼ x 16¼ x 18¼ Allington and Curtis No. 55 (belt drive).
10½ x 10½ American size 5 (belt drive).
(2) 1100 cfm @1#, 8 x 8 Sturtevant 24" wheel (belt drive).

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVENUE
CLEVELAND 14, OHIO

For Sale

REBUILT EQUIPMENT IN STOCK

Molding Machines

2—International Type F 24" x 10" Stationary Power Jolt, Rollover, and 10" draw.
1—Plain Jolt 36" x 48" Table 12" dia. cyl.
1—Plain Jolt 42" x 60" Table 17" dia. cyl.
1—Plain Jolt 48" x 72" Table 14" dia. cyl.
2—Arcade Modern No. 2-38 Portable or Stationary Hand operated Squeeze Rollover Draw with swing out table.
5—Mumford 3" cyl. Core Jolt with 20" x 15" table.

Metal Melting Equipment

New 32" to 41" dia. shell cupolas made to order.
1—Monarch Tilting Iron Pot Aluminum Furnace 100 lbs. cap. Gas or Oil.
2—Hausfeld Tilting Crucible Aluminum Furnaces 33" dia. shell. Gas or Oil.
2—Hausfeld Open Flame Tilting Brass Furnaces 400 lbs. cap. Gas or Oil.
2—Monarch-Rockwell Rotating 500 lbs. brass. Oil.

Blowers for Cupolas and Furnaces

Maxon-Premix Blower Sets for Gas ⅛ to 1 H.P.
Motor Driven Centrifugal blowers to 2 lbs. press.
Belt Driven Centrifugal blowers for Cupolas.

Tumbling Mills and Sand Blast

1—Barrel Type Magnetic Separator—AC driven with DC generator.
3—Portable Sand Blast generator tanks 500 lbs. sand capacity.
2—4000 lbs. cap. Tilting Crane Ladles, V-bail, worm geared.
1—Approx. 8 cu. ft. cap. tilting trough type sand mixer.
Air Compressors 1 to 60 H.P.

CLIFTON MACHINERY CO.
1023 W. 6th ST. CINCINNATI 3, OHIO
PHONE PARKWAY 7812

FOR SALE

Heavy duty motorized rod cutter, 65 cuts per minute; capacity: ¾ inch round hot rolled steel. Brand new. $890.00 f.o.b. Cleveland. Address Box 772, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

1—No. 4 Sly Sand Blast complete, like new, in use less than one year. Immediate delivery.

THE REPUBLIC BRASS COMPANY

1623 E. 45TH ST.
CLEVELAND 3, OHIO

FOR SALE

Large quantity of Cherry Flasks about 12" x 18", also jackets for same. Address: BILLARD MACHINE & TOOL CO., MANSFIELD, PA.

FOR SALE

110 car link belt track type foundry mold or core conveyor. Immediate delivery. Speed 6 to 24 FPM. Car size 4' 6" x 2' 6". Complete with drive and motors. 220—440 voltage, frame track, supports, take-up, with installation plans etc. Used less than 6 months. Call or write: MONTAGUE CASTINGS COMPANY, 791 W. CLAY AVE., MUSKEGON, MICHIGAN.

FOR SALE

1 Mott tank sandblast with hose, helmet, nozzles, etc. Good condition. $100.00.
1 Simpson mixer 4 Cu. Ft. with speed reducers 5 H.P. motor and coupling. Good condition, $500.00.
1 35 H.P. 220-volt 3-phase 60-cycle motor 900 RPM, $200.00.
1 Chicago Pneumatic 10x10 compressor with 50 H.P. motor, belt and spare parts, $500.00.

KEEN FOUNDRY COMPANY
GRIFFITH, INDIANA

FOR SALE

Ransohoff wet tumbling mill, 22 cu. ft. capacity, wood lined, automatic star return, side loading, end unloading, 5 HP, 3 phase, 220 V, unused, also 1000 lbs. #5 Honite. Address: Box 942, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

For Sale

OVERHEAD CRANES

1-Ton
Whiting 33' Span
Curtis 24' Span
1½ Ton
Shepard Niles 25'6" Span
P & H 34' Span
2-Ton
Louden 19'2" Span
Box 36'9" Span
Detroit 28' Span
3-Ton
Shaw 33' Span
P & H 25' Span
Northern 22' Span
Manning, Maxwell & Moore 48'5⅛"
"Conco" 48" and 26'6" Spans
5-Ton
Whiting 47'4" Span
38'10½" Span D.C.
Northern 30'9" Span
Milwaukee 70' Span
Milwaukee 66'9" Span
Manning, Maxwell & Moore 70' Span
Manning, Maxwell & Moore 47'4" Span
Shaw 36' Span
Champion 37'6" Span
American 70' Span
American 47'4" Span
6-Ton
P & H 77' Span
American 77' Span
7½-Ton
Shepard 26' Span
10-Ton
Shaw 68' Span
Shaw 73' Span
P & H 30' Span
P & H 87'6" Span
P & H 80' Span
Northern 71'10½" Span
Northern 60' Span
Morgan 55'6" Span
Morgan 39'5" Span
Morgan 52'3" Span
Milwaukee 66'9" Span
McGill 85' Span
Lane 50' Span
Unsco 75' Span
Dominion 35' Span
Cleveland 38'1½" Span
Cleveland 50' Span
Alliance 71'10½" Span
Alliance 58'9" Span
Albany 60' Span
15-Ton
Whiting 71'10½" Span
Northern 53' Span
Erie 60' Span
Chesapeake 55'6" Span
Case 51' Span
20-Ton
Shepard Niles 49'6" Span
P & H 51'4" Span
Northern 60' Span
Morgan 60' Span
Cleveland 65' Span
25-Ton
Whiting 106' Span
Tysaman 60' Span
P & H 70' Span
Morgan 52'3" Span
Cleveland 106' Span
Case 63' Span
Bedford 50' Span
30-Ton
Whiting 80' Span
P & H 80' Span
P & H 60' Span
Morgan 30' Span
Case 41' Span
35-Ton
Bedford 50' Span
Northern 22' Span
50-Ton
Shaw 95' Span
Shaw 65'10" Span
Dominion 80' Span
Cleveland 71'10½" Span
75-Ton
Morgan 59'2½" Span
Alliance 78' Span
Alliance 37' Span
80-Ton
American 40'6" Span
125-Ton
Morgan 100' Span
150-Ton
Whiting 30' Span
175-Ton
Morgan 54' Span
200-Ton
Alliance 100' Span

Telephone us collect to discuss your requirements.

ECONOMY CO., INC.
49 VANDERBILT AVENUE, NEW YORK 17, N. Y.
Telephones: MUrrayhill 4-2294, 4-2893, 4-2295, 4-2844, 4-2296, 4-8292

CUPOLA BLOWERS FOR SALE

33 C.F. Connersville 4 Bearing Rotary Positive Blower, 60" barrel length, 20" dia. outlet & intake. Arr. for m.d.

16.2 C.F. Connersville 6 Bearing Rotary Positive Blower, 27" barrel length, 12" dia. outlet & intake. Arr. for m.d.

14.2 C.F. Connersville 4 Bearing Rotary Positive Blower, 30" barrel length, 12" dia. outlet & intake. Arr. for m.d.

Also centrifugal blowers.

Complete list on request.

INDUSTRIAL PLANTS CORPORATION
316 S. LASALLE ST.
CHICAGO 4, ILLINOIS

MODEL J
VERTICAL
CENTRIFUGAL
CASTING MACHINE

Manufactured by
Centrifugal Casting Machine Co.
Tulsa, Oklahoma

Specially Priced
For Immediate Sale!

Every Offer Considered

F.O.B. Jersey City

WRITE BOX 446

CROMWELL ADVERTISING AGENCY, INC.
122 E. 42ND ST., NEW YORK 17, N. Y.

FOR SALE

Subject to prior sale, F.O.B. Plant, Bridgeport, Conn.
One Slightly Used Robins Model 16-40" Style J6 Floatex Shakeout equipment with perforated plate deck having ¾" x 3" perforations and superimposed by sloping skidrails for carrying and discharging castings with V-rope drive less motor.
In first class condition.
Eight Industrial Heater Crucible Oil Burning Pot Heaters complete with burners for #90 Crucibles. Some new—others slightly used.
In first class condition.
Equipment may be inspected at the plant.

JENKINS BROS.
510 MAIN ST.
BRIDGEPORT 9, CONN.

FOR SALE

1 No. 8 Demmler core blowing machine. Price upon application.

THE C. I. CAPPS COMPANY, INC.

P. O. BOX 3335

JACKSONVILLE 6, FLA.

FOR SALE

One Pangborn No. 1 sand blast room complete with tank, separator, hose, etc. Room size 9' x 9' x 7'-6". Priced for quick sale. Must be moved at once.

OSWEGO IRON WORKS, INC.
OSWEGO, N. Y.

FOR SALE

Pangborn rotoblast table model, good condition, $1200.

UNITED FOUNDRIES CO.
512 BOULEVARD BLDG., DETROIT 2, MICH.
MA 8275

For Sale

FOR SALE

2—Branford shakeout table vibrators, 5" size. Have not been used since factory reconditioning.
1—Modern cylindrical type pouring ladle 2500# capacity. Complete with movable cover and toggle arms. No stationary cover section.

THE ACME FOUNDRY & MACHINE COMPANY
BOX 563 COFFEYVILLE, KANSAS

REBUILT EQUIPMENT

Molding machines, all types; tumbling mills; furnaces; cupolas; air compressors; hoists, rammers, all types; ladles, all types; sand mixers; sand blast tanks; core machines, etc. All equipment rebuilt and guaranteed.

HAYNES FOUNDRY EQUIPMENT COMPANY
814 ADA ST. KALAMAZOO 21, MICH.

FOR SALE

1 Nicholls #11-32 type Heavy Duty Combination Jolt and Power Squeezer Moulding Machine with Pattern Draw—Serial 41022. Like new. Price, $700.00.
1 International Jolt, Squeeze, power pin lift Moulding Machine. Single-head style, 12" B.K.L. Serial #28210, 5½" draw. Width of pin centers, 12" min., 20" max. Length of pin centers, 14½" min., 21½" max. In good condition. Price, $550.00.
1 #1 Blystone Core Sand Mixer with clutch and pulley drive. Excellent condition. Price, $275.00.

WELLS MANUFACTURING COMPANY
1856 MINER STREET
DES PLAINES, ILLINOIS

FOR SALE

One Car-type Mould Conveyor consisting of 300 ft. of Link-Belt C-93 Chain, approximately 90 cars 18" x 20", drive unit with 7½ Horse Power Motor, 2 turns, and all the necessary track and frame support for the cars. This unit can be driven at speeds from 5 to 15 ft. per minute. The unit is torn down, piece marked, and ready for shipment. The original installation cost of this unit was $29,000. It can be purchased for a small fraction of the cost.

PRECISION FOUNDRY INC.
NEW CASTLE, PA.

FOR SALE
1800' AIR COMPRESSORS

2—Sullivan type WN-31 air compressors, angle compound, 2 stage, direct connected to General Electric 300 H.P. synchronous motors, exciters, control panels, after-coolers, air receivers, etc.

NEW 1943 IMMEDIATE DELIVERY

OTHER SIZES OF
LATE TYPE MACHINES AVAILABLE

DENNY & CLARK
910 N. MARSHFIELD AVE, CHICAGO 22, ILL.

FOR SALE

Molding machine, Johnston & Jennings No. 918-B jolt rollover, pattern draw, complete with automatic adjustable rollout conveyor. Table size 44" x 54"; pattern draw 20"; maximum height 47"; 9" jolt cylinder; 2-12" rollover cylinders; 2,000 lb. capacity @ 80 lb. pressure; shipping weight approximately 11,000 lbs. Excellent condition, purchased new in 1944, used very little. Battery of two used rack type core ovens with one combination gas and oil burner mounted on top of oven. Manufactured in 1938 by Foundry Equipment Company, Cleveland. Overall outside dimensions: 14' 9" width x 20' 0" depth x 20' 0" height. Outside dimensions of oven: 14' 9" width x 19' 8" depth x 8' 7" height. Dimensions inside each compartment: 6' 11" width x 19' 0" depth x 8' 2" height. Three racks deep—total capacity 6 racks. Very good condition.
40 used well constructed steel core racks 5' x 5' x 6' high, having 5, 6, 7 or 8 shelves.

GREDE FOUNDRIES, INC.
P. O. BOX 443 MILWAUKEE, WISCONSIN

Company Community Country

YOU HELP ALL 3 WITH THE P. S. P.

● Participants in the Payroll Savings Plan benefit directly in terms of cash—because U. S. Savings Bonds at maturity pay $4 for every $3 invested.

Your company, your community, and your country benefit indirectly in terms of security—because: (1) Employees with a solid stake in the future are likely to be stable, productive workers. (2) The Bond-buying habit of local citizen-employees means a reserve of future purchasing power—a safeguard for the stability of your community. (3) Every Bond bought temporarily absorbs surplus funds and helps check inflationary tendencies.

You're doing everybody a favor—including yourself—by supporting the Payroll Savings Plan.

ARE YOU USING THESE BOOKLETS?

If not, or if you wish additional copies, just ask your State Director of the Treasury Department Savings Bonds Division.

The Peacetime Payroll Savings Plan—A booklet, published for key executives by the Treasury Department, containing helpful suggestions on the conduct of your payroll savings plan for U. S. Savings Bonds.

This Time It's For *You*—A booklet for employees . . . explaining graphically how the payroll savings plan works . . . goals to save for, and how to reach them with Savings Bonds.

The Treasury Department acknowledges with appreciation the publication of this message by

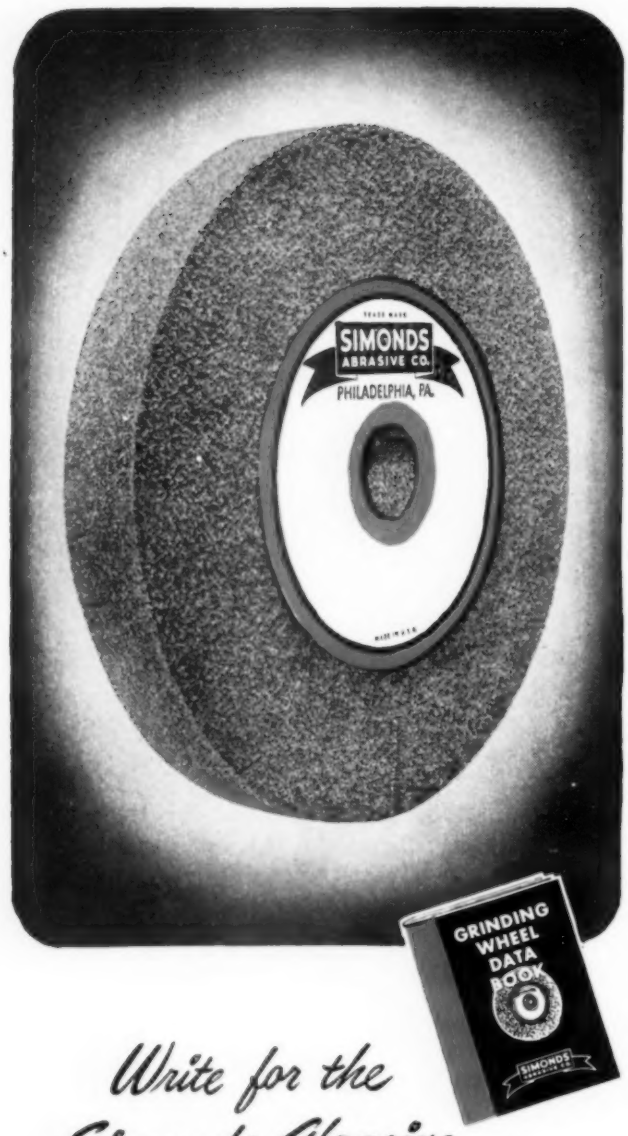
THE FOUNDRY

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council

Rule O' Thumb

may get you

half a wheel



Write for the Simonds Abrasive Data Book

Why wear down and out two or three wheels when one might do the job and do it better? Selecting wheels by guess adds up to too much money for too many wheels; too much cost because of sluggish stock removal, inaccuracies in finishing, and rejected work.

These are facts and are good reasons why there are thousands upon thousands of combinations in grain, size, grade, structure and bond in the complete line of Simonds Abrasive Borolon (aluminum oxide) and Electrolon (silicon carbide) products.

Whether you are working on soft plastics or the hardest metal, with the Simonds Abrasive Data Book you have the means of intelligently selecting the grinding products that will do your jobs better and cheaper.

Borolon and Electrolon Stocks are now restored for prompt supply of your requirements. You will find Simonds Abrasive Distributors ready to help you in your wheel selection and prompt to serve your needs.

SIMONDS ABRASIVE CO.

SIMONDS ABRASIVE CO. *is a Division of* SIMONDS SAW AND STEEL CO. *Other affiliated companies:* SIMONDS STEEL MILLS SIMONDS CANADA SAW CO. LTD.

SIMONDS ABRASIVE COMPANY • PHILADELPHIA 37, PA. • DISTRIBUTORS IN ALL PRINCIPAL CITIES

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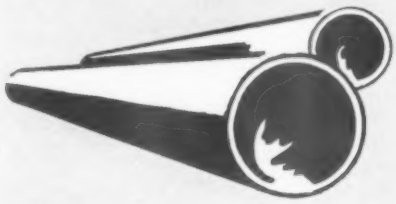

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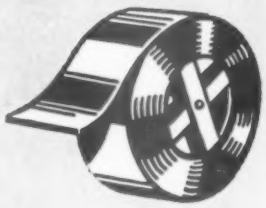

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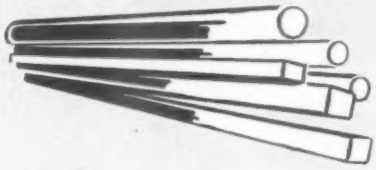

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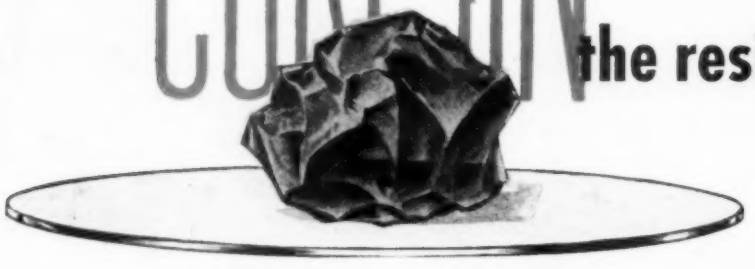

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The New LINK-BELT Oscillating-Trough Conveyor Cuts Maintenance in Foundry Service

Left: Squeezer molds made in snap flasks, are automatically discharged after being poured and sufficiently cooled, from two Link-Belt mold conveyors to the oscillating conveyors shown. These conveyors handle the hot sand and castings at a speed of about 40 F.P.M. and convey them to a central Link-Belt shakeout screen. Each of these conveyors has a capacity of 75 tons of sand and castings per hour. The power consumed is less than for an apron conveyor.

Below: Poured molds being dumped to a 36" wide Link-Belt oscillating conveyor in tunnel below floor at Gunite Foundries Corp., Rockford, Ill. This conveyor takes the hot sand and castings to the shakeout.

Check These Advantages

√ 1. Molds can be discharged to this conveyor from several points at once. Action of the conveyor levels off sand and castings — no spillage occurs.

√ 2. Hot sand, castings, metal particles, core wires and gaggers can't burn out or injure its steel conveyor trough.

√ 3. Greatly reduced maintenance as compared with other methods of handling these abrasive materials.

√ 4. No return runs required.

√ 5. Can be installed in any length, simply by the addition of sections.

√ 6. Can be built to handle capacities in a wide range, by varying the widths and depths of troughs.

√ 7. No "joints" to be attacked by abrasion; hence much le maintenance.

√ 8. There are no parts moving in respect to each other, exce the drive; hence no lubrication necessary except at this poin

√ 9. Section of the conveyor can be set at angles with transf from one to the other involving only an 8" drop. This gent handling protects castings.

√ 10. Power requirements are remarkably low.

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AND PREPARATION MACHINERY